



United States  
Department of  
Agriculture

Forest  
Service

Chippewa National Forest  
Supervisor's Office

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File Code: 1940

Date: March 5, 2020

Dear Interested Party,

I am pleased to share with you the 2016-2017 Chippewa National Forest Monitoring and Evaluation Report. In this report, we consider how well we are implementing the management direction of the Forest Plan, what effects our management is having on the natural, cultural, and social resources, and how those resources are being affected by other factors.

The report addresses the monitoring questions in the Chippewa National Forest Plan, (Chapter 4 Monitoring and Evaluation) for the following resource areas and monitoring items: Tribal Rights and Interests, Timber, Climate Change, Cooperation, Multiple Uses, Wildlife and Plants, Insects and Disease, Transportation, Landscape Ecosystems and Ecological Conditions and Vegetation, Recreation, Watershed Health and Riparian, Soils, Social and Economic Stability, and Special Uses.

Monitoring is a critical component of our management. We remain committed to identifying what is working well in our programs, and what isn't, sharing the results, and learning from all that we do. We consistently work with Tribal, local, state and federal agencies, along with many other partners to manage resources on the Chippewa National Forest in an integrated way that ensures that meeting objectives in one area doesn't adversely affect another.

I am committed to finding solutions where monitoring shows a new approach is needed. If you are interested in learning more about our monitoring efforts, please contact Chris Worthington at 218-335-8643 ([christopher.worthington@usda.gov](mailto:christopher.worthington@usda.gov)).

Sincerely,

DARLA LENZ  
Forest Supervisor

Enclosure







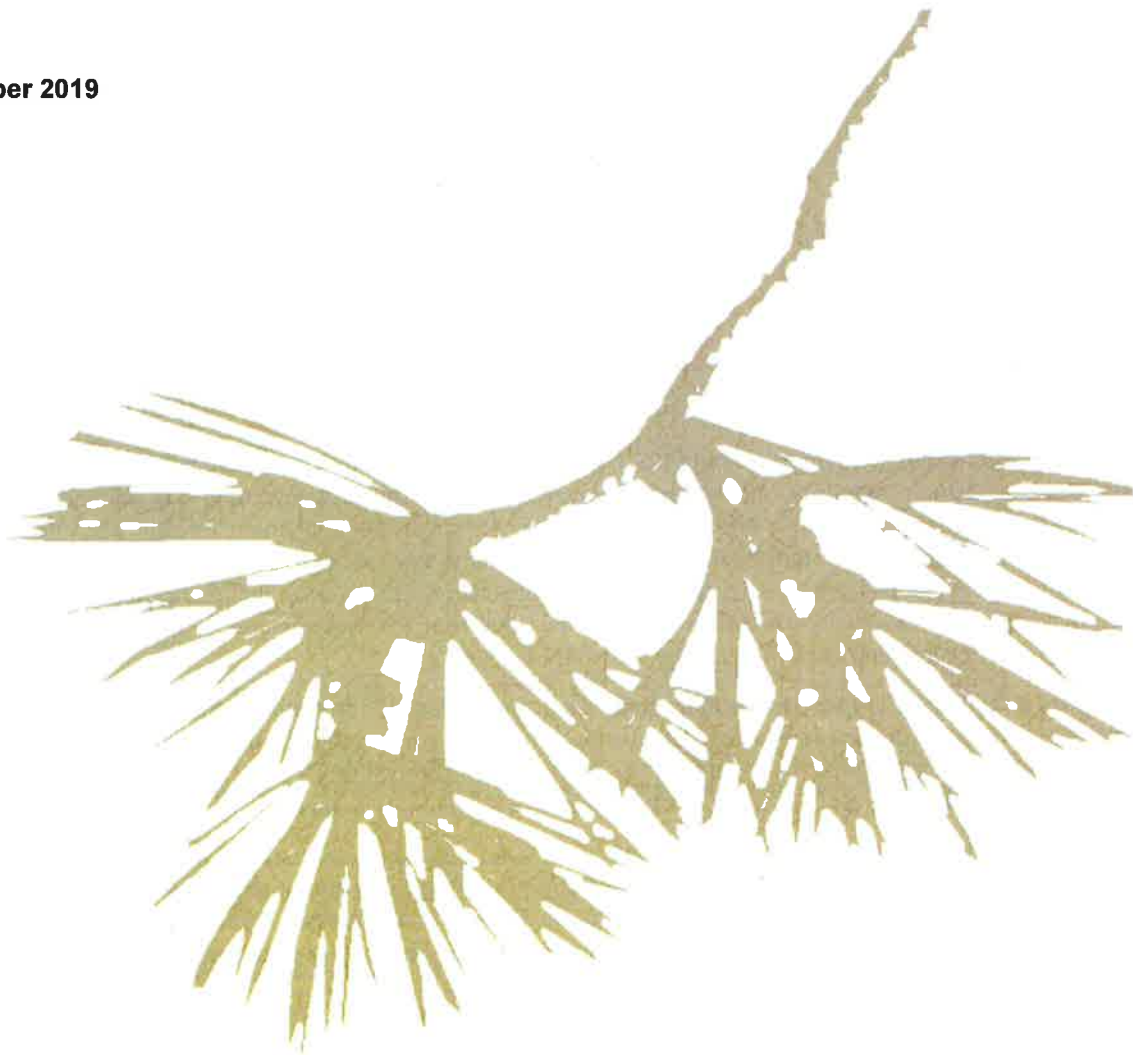
United States Department of Agriculture

# **Chippewa National Forest**

**USDA Forest Service | Eastern Region  
Milwaukee, Wisconsin**

**Monitoring and Evaluation Report  
Fiscal Years 2016-2017**

**October 2019**



For more information:

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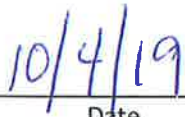
**FISCAL YEARS 2016-2017  
MONITORING AND EVALUATION REPORT  
APPROVAL AND DECLARATION OF INTENT**

I have reviewed the Fiscal Years 2016-2017 Monitoring and Evaluation Report for the Chippewa National Forest that was prepared by forest employees. I am satisfied with the findings and intend to consider recommendations made during project development and plan revision. The Monitoring and Evaluation Report meets the intent of both the Forest Plan (Chapter 4) as well as the 36 CFR 219.

This report is approved:



DARLA LENZ  
Forest Supervisor



Date



## Executive Summary

The following information consists of key points from resource areas included in this Monitoring and Evaluation Report for fiscal years 2016 and 2017. More detail that supports these statements can be found in the document.

### 1. Multiple Uses

The Forest's **target** for annual timber volume sold has averaged 46.85 million board feet (MMBF) since the beginning of the second decade of Forest Plan implementation (fiscal years 2014 to 2017). The actual **volume sold** has been slightly above the target during this time with **sales averaging 48.58 MMBF**. Volume sold has fluctuated from a high of 51.88 MMBF in 2014, in part due to blowdown events, to a low of 45.87 MMBF in 2017. The Allowable Sale Quantity for Decade 2 of the Forest Plan (2014 to 2024) is 60 MMBF, a bit higher than in the first decade where it was 58 MMBF (see 7 Social and Economic Stability).

The Forest accomplished restoration work through an **expanded use of Stewardship** contracting and the introduction of **Good Neighbor Authority** (GNA) as a new tool in 2016. The Forest continues to enhance the use of Stewardship and Good Neighbor Authorities as tools to improve efficiencies and accomplish Forest priorities. The figures in the table below include Stewardship and GNA work. GNA sold in 2016 was 0.44 MMBF and 80 acres; and in 2017, it was 1.79 MMBF and 118 acres.

The figures in the table below include Stewardship and GNA work.

Fiscal Year	Target (MMBF)	Sold (MMBF)	Sold Acres	Harvested (MMBF)	Harvested Acres
<b>FY 16</b>	48.35	48.67	6,370	45.98	5,561
<b>FY 17</b>	44.5	45.87	5,693	45.19	4,595

Stewardship contracting has increased through the past three years in MMBF sold:

Stewardship	Acres Sold	MMBF Sold	Percentage of Total Sold Volume
<b>FY 2015</b>	725	6.9	14%
<b>FY 2016</b>	1,304	8.2	17%
<b>FY 2017</b>	1,218	11.9	27%

Over the past ten years our surveys show a significant decrease in use in recreation. The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning will occur.

The Chippewa National Forest accomplished 98 percent of the terrestrial wildlife acres, 100 percent of the aquatic lake acres and 100 percent of the stream mile outputs assigned by the Regional Office. Outputs are assigned each year by the Regional office that are consistent meeting the desired conditions and objectives in the Forest Plan. The Chippewa National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife.

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## 2. Climate Change

There is a distinct increasing trend showing that in general the growing season appears to be getting longer. Within the range of the data, time between the last frost of spring and the first frost of fall has gone from approximately 110 days to almost 130 days.

## 3. Cooperation

Grants and agreements make an important contribution to provide work opportunities and to achieve resource accomplishments.

## 4. Insects and Disease

There has been a shift in the species affected, or agents involved. Most notably, damage and mortality has increased for the tamarack forest type. Tamarack continues to be impacted by the larch casebearer and Eastern larch beetle. The larch casebearer increased over ten-fold from 2016, and seven-fold from 2015, coming in with 8,965 acres in 2017. Eastern larch beetle is a native bark beetle that attacks only larch species. Statewide, 2017 was a record setting year for acres affected by Eastern larch beetle. Newly affected acres on the Chippewa in 2017 totaled 2,267. In 2016, new acres totaled 1,332.

## 5. Landscape Ecosystems and Ecological Conditions and Vegetation

With the exception of the Dry Pine Landscape Ecosystem, the Forest is below the Decade 2 objectives for the amount of 0-9 age class even with the blowdown event of 2012. This trend is anticipated to continue well into Decade 2 (2021) which takes into consideration treatments that are planned and under decision but have yet to be implemented. This trend holds true for all the Landscape Ecosystems. The focus on commercial thinning of red pine stands contributes in part to these results.

The amount of mature/older forest on the landscape has steadily increased since 2003. However, results vary by Landscape Ecosystem as to whether management indicator habitat objectives to increase, maintain, or decrease mature and older forest are being met.

Jack pine and spruce-fir forest types are well below decadal objectives and contribute to an overall decline in the amount of conifer on the landscape.

Amount of aspen on the landscape has declined since 2003 yet still exceeds the objectives for all Landscape Ecosystems. Additional decreases in aspen are desired.

Northern hardwoods exceed objectives due to stand re-delineation and typing and recent stand data. Further increases in this forest type are expected due to regeneration treatments, particularly in aspen stands, that promote the release of young hardwoods in stands.

## 6. Recreation

The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning will occur.



Participation in recreational activities is the way that most of us come to our National Forests and Grasslands, making it an important portal for understanding their meaning, history, and relevance, and that of public lands as a whole.

Recreation opportunities on the Chippewa National Forest directly provide benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land through recreational activities associated with recreation facilities.

## 7. Social and Economic Stability

Output levels of timber harvest have remained approximately stable, while treatment methods are deviating from those anticipated for Decade 2.

The annual target for timber volume sold has averaged 46.85 MMBF since the beginning of Decade 2 of Forest Plan implementation (fiscal years 2014 to 2017). The actual volume sold has been slightly above the target during this time with sales averaging 48.58 MMBF. Volume sold has fluctuated from a high of 51.88 MMBF in 2014, in part due to blowdown events, to a low of 45.87 MMBF in 2017. The Allowable Sale Quantity for Decade 2 of the Forest Plan (2014 to 2024) is 60 MMBF, a bit higher than in Decade 1 when it was 58 MMBF.

The ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the first three years of Decade 2.

## 8. Soils

Overall, past soil disturbance monitoring indicates harvest activities alone have resulted in little soil disturbance and Forest Plan desired conditions and objectives are generally being met.

Although the general level of soil disturbance is low for post-harvest evaluations, some of the pre-harvest evaluations had some soil disturbance. Further evaluation of this monitoring question and indicator is necessary to ensure forest management activities are not affecting long-term soil productivity and viability of natural ecosystems.

## 9. Special Uses

The Special Uses program provides services supporting our national policy and federal land laws by authorizing uses on National Forest System lands. With the Chippewa National Forest's checkerboard ownership, there are many opportunities and needs to cross National Forest System lands to reach other ownerships. In addition, due to the location of lakes on the Forest, several recreational opportunities were provided such as private resorts, recreation residences, and organizational camps.

The Forest works with a diverse pool of customers including private citizens, utility companies, oil and gas companies, resorts businesses, non-profit agencies, tribal governments, state and local governments as well as other federal agencies. In fiscal years 2016 and 2017, 677 and 647 special use permits were issued that generated \$ 1,264,656 and \$1,266,694 in revenue, respectively.

The Chippewa National Forest offers a variety of special forest products to the public for personal and commercial uses. Many of the special forest products including balsam boughs and firewood are economically and culturally significant to the public.

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## 10. Timber

The Forest Service harvests timber from National Forest System lands only where there is assurance that such lands can be adequately restocked within five years after harvest (National Forest Management Act (NFMA)(1976)). Regeneration harvest acres were certified stocked within five years 78 percent of the time in 2016 and 61 percent of the time in 2017. Sites not certified within the 5 year period are still in a stage of regeneration, just not yet certified. Factors which impede regeneration include predation by deer and rabbits, as well as competition from woody and herbaceous vegetation. Success was greatest on coppice cuts (aspen regeneration) sites with natural regeneration of hardwood/aspen from suckers and sprouts.

## 11. Transportation System

There was an emphasis on road inventories in the last two years to improve the maps and database to more accurately reflect actual ground conditions. This accounts for some of the mileage changes between Operating and Objective. The entire Forest road inventory is scheduled to be completed by December, 2018.

Objective-TS-8 of the Forest Plan was to decommission 200 miles in the first decade. This Objective was met. The overall road system miles decreased by another 98.9 miles since the 2014 Monitoring plan. The Forest continues to decommission more roads to downsize the transportation system to reach the minimum system needed while still providing adequate access.

## 12. Tribal Rights and Interests

The Forest has a legal obligation to uphold its Federal Trust responsibility to the Leech Lake Band of Ojibwe. A Memorandum of Understanding signed by the Leech Lake Band of Ojibwe and the Chippewa National Forest in 2013 expresses the will of each to work together to conserve resources significant to the Band's way of life and cultural identity. Pursuant to recommendations identified in a letter from the Chief of the Forest Service to the Band's Chair, the Memorandum of Understanding is being amended to include provisions for achieving the Band's desired vegetative conditions on National Forest System lands by developing a shared decision making model for commercial timber harvesting and other natural resource considerations, using traditional ecological knowledge offered by the Band, and expanding the use of the Tribal Forest Protection Act.

## 13. Watershed Health and Riparian

Relevant Best Management Practices were implemented and successful at all monitored sites. No current issues were affecting watershed health at any of the sites.

Forest management does not appear to affect water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems. Legacy impacts from roads and dams are still affecting the Forests watershed; however, current activities do not appear to be and in some cases are improving the watershed condition (e.g., Knutson Dam removal).

## 14. Wildlife and Plants

All management activities were completed within 2004 Forest Plan direction for endangered, threatened and Regional Forester Sensitive Species. Forest Plan standards and guidelines are being met

The Forest contributed toward the conservation and recovery of the Canada lynx, gray wolf, northern long-eared bat and rusty patched bumble bee through habitat and access management practices,

collaboration with other federal and state agencies, as well as researchers, tribal bands and non-governmental partners.

The Forest will continue to plan on accomplishing annual wildlife outputs consistent with Forest Plan goals and objectives.

There has not been an increase in the snowmobile routes across the Forest.



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# Chapter 1.

## 1. Introduction

This report is compiled under the 2004 Chippewa National Forest Plan signed by Regional Forester, Randy Moore, on July 30, 2004, as amended and updated. The Monitoring and Evaluation Report covers the monitoring activities, results and recommendations for fiscal years 2016 and 2017.

This report uses Chapter 4 of the 2004 Forest Plan (Monitoring and Evaluation) as its framework, updated in 2016. That chapter provides a list of monitoring questions to evaluate resource areas. There are also legally required monitoring items that include specific compliance requirements. Reference Chapter 4 of the Forest Plan for a more complete overview and details.

Effective Forest Plan monitoring and evaluation fosters improved management and more informed planning decisions. It helps identify the need to adjust management direction, such as desired conditions, goals, objectives, standards and guidelines, as conditions change. Monitoring and evaluation helps the Agency and the public determine how a Forest Plan is being implemented, whether plan implementation is achieving desired outcomes, and whether assumptions made in the planning process are valid.

Monitoring and evaluation are learning tools that form the backbone of adaptive management. With these tools, information is collected and compiled to serve as reference points for the future; new scientific understanding and technology; changes in law, policy and resource conditions; growing concerns; trends and changing societal values are incorporated into land management planning; and the scientific validity and appropriateness of assumptions used in the development of the Forest Plan is evaluated. In short, they breathe life into a static document—the Forest Plan—to make it dynamic, relevant, and useful.

Several kinds of activities can be referred to as “monitoring.” Programmatic monitoring tracks and evaluates trends of ecological, social, or economic outcomes. Project implementation monitoring monitors compliance with Forest Plan standards and guidelines. Effectiveness monitoring evaluates how effective our management actions are at achieving desired outcomes. Validation monitoring verifies assumptions and models used in Forest Plan implementation. Monitoring may also address issues for large geographic areas of which the Forest is a part.

The biennial Monitoring and Evaluation Report is of value to Forest Service leadership, managers and employees, as well as to the public. The information gained from monitoring is used to determine how well the desired conditions, goals, objectives, and outcomes of the Forest Plan have been met. The biennial Monitoring and Evaluation Report provides a readily available reference document for Forest Service managers as they plan, evaluate the effects of actions on resources, and implement future projects. This information can illuminate changes needed in project planning and implementation, or changes needed in Forest Plan direction. This report also describes to the public how their public lands are being managed and how effectively the commitments made to them within the Forest Plan are being met.

In addition to the information summarized and presented in this report, the data compiled, methodologies used, and supporting documents are part of the project file and are available upon request at the Supervisor's Office in Cass Lake, Minnesota.

Chapter 2 of this report consists of a report summary for the resource areas. Each resource section has the following discussion:

- **Monitoring Question.** This question is the same as identified in Chapter 4 of the Forest Plan. The questions are tied to monitoring drivers consisting of the desired conditions, objectives, standards and guidelines specified in the Forest Plan for that resource. The monitoring drivers are not included in this report but can be found in the project file. Similarly, the monitoring methods are in the project file. They consist of methods used, locations, timing, and processes of monitoring data collection.
- **Results.** This section captures the progress in implementing Forest Plan direction, reaching objectives, goals, desired conditions and producing goods and services. This section may also address the effectiveness of standards and guidelines, specific management practices, design features, or mitigation measures.
- **Implications.** This section discusses the interpretation of the data and describes what the results mean.
- **Recommendations.** Identifies recommendations for ongoing or future projects, particularly if there is a shift or adjustment in direction. Included are any potential changes to existing Forest Plan direction.

Chapter 3 addresses amendments and corrections to the Forest Plan. A complete listing of all the changes made since 2004 are provided. In fiscal year 2016, the Forest Plan Chapter 4 Monitoring and Evaluation was updated, this report responds to those updates. In fiscal year 2017 no amendments or corrections were proposed to the Forest Plan.

Chapter 4 is a list of the Forest Service employees that provided information contained in this report. The report incorporates information gathered by resource specialists for the most part from the Chippewa National Forest.

This report and past reports are posted on our Forest website:

<https://www.fs.usda.gov/main/chippewa/landmanagement/planning>

## 2. Monitoring & Evaluation Requirements

Minimum monitoring and evaluation requirements have been established through the National Forest Management Act (NFMA) at 36 Code of Federal Regulations (CFR) 219. Some requirements provide guidance for the development of a monitoring program, while others include specific compliance requirements.

Monitoring and evaluation are separate, sequential activities required by NFMA regulations. Monitoring involves the repeated collecting of data by observation or measurement. Evaluation involves analyzing and interpreting monitoring data. The information gained from monitoring and evaluation is used to determine how well the desired conditions, goals, objectives, and outcomes of the Forest Plan are being met. Monitoring and evaluation are critical steps in the process of keeping the Forest Plan responsive to changing conditions, thereby providing the feedback mechanism for an adaptive management framework. The results are used to identify when changes are needed to the Forest Plan or the way it is implemented.

Forest Plan monitoring on the Chippewa National Forest has three major components: the Monitoring Program (contained within the Forest Plan), the Monitoring Guide, and the biennial Monitoring and Evaluation Report. Each are described below.

### 2.1 Monitoring Program

Use this section to describe the monitoring program contained within the Forest Plan.

The monitoring program contained within the Forest Plan is strategic in nature and provides programmatic direction for monitoring and evaluating Forest Plan implementation. The monitoring program addresses several types of monitoring. These requirements fall into four broad categories:

- Category 1: Required monitoring items (NFMA and 36 CFR 219 regulations)
- Category 2: Attainment of goals and objectives
- Category 3: Implementation of standards and guidelines and
- Category 4: Effects of prescriptions, management practices, and off-road vehicles

Required Category 1 monitoring items are mandatory components of every Forest Plan, whereas Category (2) through (4) monitoring items are more flexible and tailored to address issues raised through public scoping and interdisciplinary team review. A more complete description of Category 1 through 4 monitoring items can be found in Chapter 4 of the 2004 Forest Plan.

Budgetary constraints may affect the level of monitoring that can be done in a particular fiscal year. If budget levels limit the Forest's ability to perform all monitoring tasks, then those items specifically required by law are given the highest priority.

### 2.2 Monitoring and Evaluation Implementation Guide (Monitoring Guide)

The Monitoring and Evaluation Implementation Guide (Monitoring Guide) is part of the overall monitoring framework for the Chippewa National Forest. While Chapter 4 (Monitoring and Evaluation) of the Forest Plan is strategic in nature and provides programmatic direction for monitoring and evaluating Forest Plan implementation, the Monitoring Guide provides direction that is more specific to implement the monitoring strategy outlined in the Forest Plan.

The Monitoring Guide details the methodologies and protocols used to conduct monitoring and evaluation tasks identified in the 2004 Forest Plan for the Chippewa National Forest. The Monitoring Guide also assigns responsibilities for monitoring and evaluation tasks, and defines where monitoring data is to be stored.

The guide is flexible and may be changed as new methodologies and techniques are developed. It allows the principles of adaptive management to be applied so that as monitoring techniques are implemented they can be evaluated for their effectiveness and efficiency (and revised as appropriate).

## **2.3 Biennial Monitoring and Evaluation Report**

Providing timely, accurate monitoring information to the decision makers and the public is a key requirement of the monitoring and evaluation strategy. The biennial monitoring and evaluation report, which provides the analysis and summary of the monitoring results, is the vehicle for disseminating this information. This report provides an opportunity to track progress towards the implementation of Forest Plan decisions and the effectiveness of specific management practices. The focus of the evaluation is in providing short and long-term guidance to ongoing management.”

Evaluation is the process of transforming data into information—a value-added process. It is a process of synthesis that brings together value, judgment and reason with monitoring information to answer the question, “So what?” and perhaps, “Why?” Evaluation requires context. A sense of the history of the place or the circumstances (temporal and spatial context) are important to the evaluation of management activities. Evaluation describes movement from a known point (base line or reference condition) either toward or away from a desired condition. The desired conditions may or may not ever be fully achieved, but it is important to know if management activities are heading in the right direction. Evaluation produces information that is used to infer outcomes and trends. Conclusions will be drawn from an interpretation of evidence. These conclusions are documented in the biennial monitoring and evaluation report.

The biennial monitoring and evaluation report is intended to be a comprehensive compilation of all the monitoring and evaluation described in the plan. This report provides summaries of data collected, and evaluations of the data. The evaluation process determines whether the observed changes are consistent with Forest Plan desired conditions, goals, and objectives and identifies adjustments that may be needed. Continuous updating and evaluation of monitoring data provides a means to track management effectiveness from year to year and to show the changes that have been made or are still needed.

Key information displayed in the biennial monitoring and evaluation report includes:

- Forest accomplishments toward achieving multiple use objectives for providing goods and services.
- The degree to which on-the-ground management is maintaining or making progress toward the desired conditions and objectives for the plan
- The effects of the various resource management activities within the plan area on the productivity of the land
- Conclusions and recommendations regarding the need to adjust monitoring or change the Forest Plan

- Status of other agency/institution cooperative monitoring
- Update of research needs
- Documentation of any monitoring that has not been completed and the reasons and rationale (budget or staffing limitations or unexpected conditions, such as a severe fire season)



## Chapter 2. Resource Reports

### 1. Multiple Uses

#### Key Points

The annual target for timber volume sold is negotiated between the Forest and the Region. The annual sell target has been relatively flat averaging 45.8 MMBF from fiscal years 2011–2017. Volume sold has been slightly above the assigned target from fiscal years 2011–2017. Acres sold have fluctuated from 4,980 acres in fiscal year 2011 to 6,434 acres in fiscal year 2013.

The ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the first three years of Decade 2.

The Forest should continue to use stewardship contracting and expand Good Neighbor Authority as a tool to accomplish restoration work.

Over the past ten years our surveys show a significant decrease in recreation use. The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning will occur.

The Chippewa National Forest accomplished 98 percent of the terrestrial wildlife acres, 100 percent of the aquatic lake acres and 100 percent of the stream mile outputs assigned by the Regional Office for fiscal years 2016 -2017. Outputs assigned each year by the Regional office are consistent with meeting the desired conditions and objectives in the Forest Plan. The Chippewa National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife.

#### Monitoring Question

How close are projected timber outputs and services to actual?

#### *Indicators:*

Forest Plan Table APP-D2: Acres of timber harvest by treatment method comparing estimated to actual.

Volume sold and harvested annually compared to the Forest Plan;

Acres sold and harvested annually compared to the Forest Plan.

#### *Results*

The data from Decade 1 indicate thinning treatments were over prescribed and even-aged treatments such as clearcut and shelterwood were under prescribed. These management choices have direct impacts on the ability of the Forest to meet age class objectives in the Forest Plan. (See 7. Social and Economic Stability section, Table 48. Decade 1 (2004-2014) Proposed and actual acres of timber harvest by treatment method and Table 49. Decade 2 (2015-2025) Probable and actual acres of timber harvest by treatment method)

The annual target for timber volume sold is negotiated between the Forest and the Region. The annual sell target has been relatively flat averaging 45.8 MMBF for fiscal years 2011–2017. Volume sold has been slightly above the assigned target from fiscal years 2011–2017. Acres sold have fluctuated from 4,980 acres in fiscal year 2011 to 6,434 acres in fiscal year 2013. (See 7. Social and Economic Stability section, Table 50 Timber Target, Volume Offered and Sold, Volume Harvested, and Uncut Volume under Contract, and acres sold and harvested from FY2011-FY2017 and Figure 14 Chippewa National Forest FY11-17 Timber Target vs. Volume Sold (MBF))

The allowable sale quantity (ASQ) is the maximum amount of chargeable timber volume that can be sold from a plan area over a ten-year planning period. The ASQ for Decade 2 is 600 million board feet (MMBF). On average, 60 MMBF is anticipated for harvest in any given year of Decade 2. The average volume sold annually in the first three years of Decade 2 was 47.5 MMBF, which is 79% of the average annual ASQ. At this rate, harvested timber would remain within the maximum amount of volume that may be offered and sold for Decade 2.

The probable area of timber harvest in Decade 2 was estimated to be 82,222 acres. The annual average harvested during the first three years of Decade 2 was 5,881 acres, which is about 64% of the annual average anticipated.

The ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the first three years of Decade 2. (See 7. Social and Economic Stability section, Table 52 Ratio of sawtimber to pulpwood volume sold from Chippewa National Forest Land and Resource EIS table TMB-20 for modified alternative E.)

See 7. Social and Economic Stability section for further discussions.

## **Monitoring Question**

To what extent do Forest recreation facilities and opportunities achieve resource and social objectives?

### *Indicator:*

Recreation partner projects, dispersed recreation inventories, significant recreation events and developed recreation improvements and projects.

### *Results*

Over the past ten years our surveys show a significant decrease in use. This could, in part, be attributed to the recession which began in 2008 as well as the decrease in outdoor users. Additionally, the Forest believes the formula used to determine visitation in 2006 was likely flawed and believe the numbers represented in years 2011 and 2016 are reflective of the actual average visitation.

The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning will occur.

Participation in recreational activities is the way that most of us come to our National Forests and Grasslands, making it an important portal for understanding their meaning, history, and relevance, and that of public lands as a whole.



Recreation opportunities on the Chippewa National Forest directly provide benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land through recreational activities associated with recreation facilities. (See 6. Recreation section, Table 39 Total Estimated Annual Visitation Estimate, Table 46 Overall visitor satisfaction.)

See section 6. Recreation for further discussions.

## **Monitoring Question**

To what extent is Forest management improving aquatic and terrestrial wildlife habitat?

### *Indicators:*

Acres of terrestrial wildlife habitat treated.

Acres of lake habitat treated.

Miles of stream habitat treated.

### *Results*

The Chippewa National Forest accomplished 98 percent of the terrestrial wildlife acres, 100 percent of the aquatic lake acres and 100 percent of the stream mile outputs assigned by the Regional Office in fiscal years 2016 - 2017. Outputs are assigned each year by the Regional office consistent with meeting the desired conditions and objectives in the Forest Plan. The Chippewa National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife. (See section 13. Wildlife and Plants, Table 70 Planned and actual wildlife and aquatic outputs for 2016-2017)

See section 13. Wildlife and Plants for further discussion.

## 2. Climate Change

Climate change was not addressed during the development of the 2004 Forest Plan. This monitoring element was added in 2016 during the transition to the 2012 Planning Rule for monitoring. A variety of options were considered to assess climate change. The option we selected was to evaluate long term trends in growing season as the dates between the last frost in the spring and the first frost in the fall. This data has been collected continuously since 1961 on the Marcel Experimental Forest which is located on the Chippewa National Forest.

### Key Points

There is a distinct increasing trend showing in general the growing season appears to be getting longer. Within the range of the data, time between the last frost of spring and the first frost of fall has gone from approximately 110 days to almost 130 days.

### Monitoring Question

How is the frost free season changing across the plan area on an annual basis?

#### *Last Updated*

This question was added to our monitoring indicators when we updated the monitoring section of the Forest Plan in 2016 to be in compliance with the 2012 Planning Rule.

#### *Monitoring Indicator*

Period of time between the last frost of spring and the first frost of fall when the air temperature drops below the freezing point of 32 degrees Fahrenheit.

#### *Monitoring Frequency*

Data is collected continuously (once an hour) at the Marcel Experimental Forest. Data will be processed and reported out every two years.

#### *Background and Drivers*

This monitoring question is one of the eight monitoring pillars described in 36 CFR 210.12. Specifically, the element says "Measureable changes on the plan area related to climate change and other stressors that may be affecting the plan area." We focused specifically on long term climate change since it tends to be a force multiplier for a variety of other stressors including insects and diseases, drought, and species composition changes.

We used data collected at the Marcel Experimental Forest which is on the Chippewa National Forest. Since we are concerned about long term change, this data set provides a continuously collected data source since 1961. Although annual weather variations of the last frost in the spring and first frost in the fall may not show a trend, over more than 55 years of data, trends can be observed.

#### *Results*

Monitoring Indicator: Period of time between the last frost of spring and the first frost of fall. The data on growing season length is plotted in figure 1

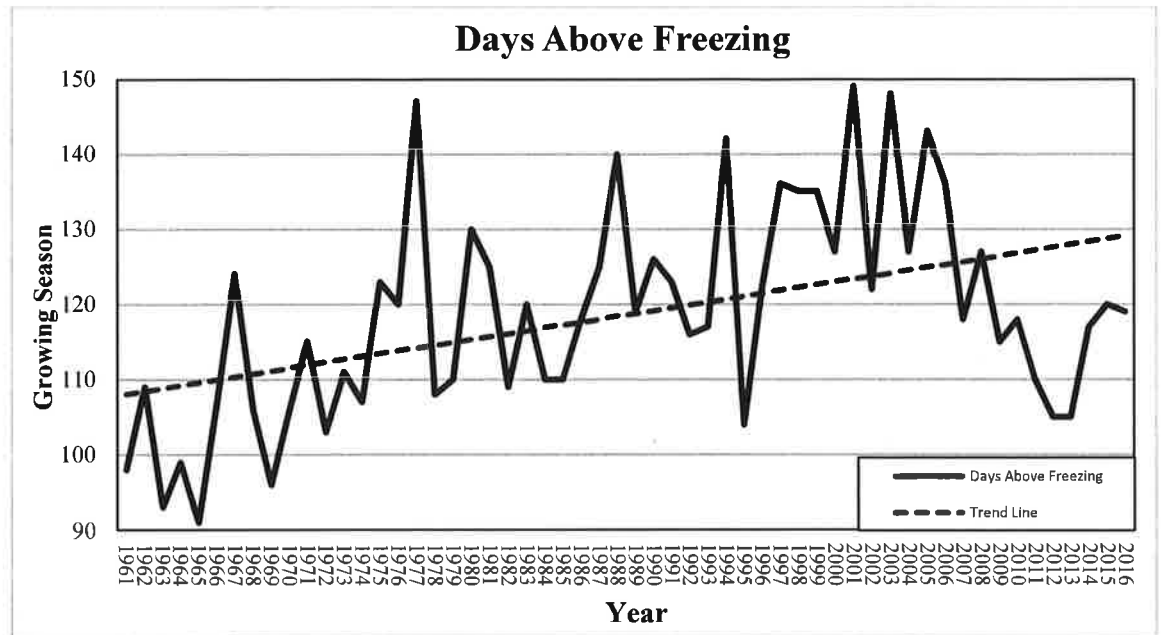


Figure 1 Annual days between last frost in the spring and first frost in the fall

### Discussion

Figure 1 clearly shows the difference between “weather” and “climate”. There is considerable variation between the length of time between last and first frosts annually. The trend line only explains only about 20 percent of the variation (0.1986), as a result of the amount of noise in this data set. However there is a distinct increasing trend showing that in general the growing season appears to be getting longer over the 55 year time span. Within the range of the data, it has gone from approximately 110 days to almost 130 days. Although not analyzed here, similar results are anticipated for the length of time in severe cold.

As was discussed earlier there are no specific goals in the Forest Plan regarding responding to climate change. However, considerable literature has been produced in the last decade regarding how to prepare forested ecosystems to the anticipated climate changes. The data collected at the Marcel Experimental Forest indicate many of the predicted changes are occurring. Since trees planted today will likely be growing in 100 years, it is appropriate to consider climate change as part of our on-going management activities.

### Recommendations

The Forest Plan does not address Climate Change directly. Since we are already incorporating some of the best available science into our analyses, and the current 2012 Planning Rule requires additional consideration of this topic, there is not a driving need to revise the Forest Plan at this time based on this particular topic. This topic may be added to a future revision effort.

### Evaluation of Monitoring Question and Indicator(s)

The monitoring question and indicator are appropriate for climate change.

### 3. Cooperation

The Forest has a growing number of partnerships and agreements. See also section 12. Tribal Rights and Interests for agreements and partnerships with the Leech Lake Band of Ojibwe.

#### Key Points

Grants and agreements make an important contribution to provide work opportunities and to achieve resource accomplishments.

#### Monitoring Question

To what extent does the Forest emphasize agency, tribal, and public involvement and inter-governmental coordination with federal, state, county governments and agencies?

#### Last Updated

2015

#### Monitoring Indicator

Number of partnerships and agreements; Stewardship contracts, and Good Neighbor Authority projects.

#### Monitoring Frequency

2 years

#### Background and Driver(s)

This monitoring question stems from the Forest Plan desired conditions:

D-CM-1

D-SE-4

D-REC-6

#### Results

Forest collaboration with external partners has been on the rise since 2005. The Grants and Agreements program on the Forest has seen an increase in the number of new partnership agreements in recent years. Table 1 presents the number of new agreements issued between 2005 and 2017 as well as the number of modifications to existing agreements.

**Table 1 New Agreements between 2005 through 2017**

Year	Number of New Agreements	Number of Modifications to Existing Agreements	Total Value of Agreements
2005	19	11	\$331,148
2006	32	11	\$611,830
2007	37	20	\$663,887
2008	37	23	\$549,769
2009	51	44	\$3,254,482*
2010	34	43	\$2,926,967*
2011	38	45	\$2,249,482
2012	36	42	\$2,551,755
2013	38	39	\$1,904,806

Year	Number of New Agreements	Number of Modifications to Existing Agreements	Total Value of Agreements
2014	40	56	\$2,493,773
2015	36	42	\$1,830,881
2016	30	32	\$2,268,439
2017	31	54	\$1,971,632

\*includes American Recovery and Reinvestment Act of 2009 Agreements

## Discussion

Since 2005, the Forest has seen an increase in the number of partnerships with the Leech Lake Band of Ojibwe that benefit natural resource management on lands within the Forest and the Leech Lake Reservation. New agreements in 2016 involved the following projects: heritage resource surveys, hazardous fuels reduction, project stand reconnaissance data; riparian and cultural resource restoration, and a wetland mitigation road project using Ottertail Power Mitigation funds. We also added funds to our agreement with the Leech Lake Band of Ojibwe to continue fruiting shrub restoration work. In 2017, we continued partnerships for heritage surveys and road maintenance as well as added an agreement for snowshoe hare habitat improvement.

The Forest continues to work with a variety of partners to provide opportunities for job training/manpower development as well as internship opportunities. A new partnership agreement with the Northwest Indian Community Development Center for job training and manpower development was established. Internship opportunities were provided to students at the Leech Lake Tribal College and Itasca Community College.

21<sup>st</sup> Century Service Corps projects were initiated with Conservation Corps Minnesota and Iowa, Northern Bedrock Conservation Corps, St. Cloud State University and the Greening Youth Foundation. The 21<sup>st</sup> Century Service Corps program promotes natural resource training opportunities to young adults ages 18-25 and veterans.

Five new Stewardship Agreements were developed in 2016-2017. Of these 5 agreements, two were Master Agreements and the remaining were for implementation of project work. Projects from approved stewardship proposals included impoundment management, road maintenance and boat access repair and maintenance.

Fiscal year 2016 also saw the development of a Good Neighbor Agreement with the State of Minnesota. The Regional Office signed a Master Agreement and the Forest implemented a Supplemental Project Agreement which includes timber removal. Work has been ongoing and the first results from the initial timber sales are displayed in table 2 and table 3.

**Table 2 Stewardship and GNA for fiscal years 2016 and 2017**

Fiscal Year	Target (MMBF)	Sold (MMBF)	Sold Acres	Harvested (MMBF)	Harvested Acres
FY 16	48.35	48.67	6,370	45.98	5,561
FY 17	44.5	45.87	5,693	45.19	4,595

**Table 3 Stewardship contracting for fiscal years 2015 through 2017**

<b>Stewardship</b>	<b>Acres Sold</b>	<b>MMBF Sold</b>	<b>Percentage of Total Sold Volume</b>
<b>FY 2015</b>	725	6.9	14%
<b>FY 2016</b>	1,304	8.2	17%
<b>FY 2017</b>	1,218	11.9	27%

## **Recommendations**

The Forest should continue to work cooperatively with external partners for the improvement of the natural resources within the forest.

## **Evaluation of Monitoring Question and Indicator(s)**

The monitoring question and indicator are appropriate for cooperation.

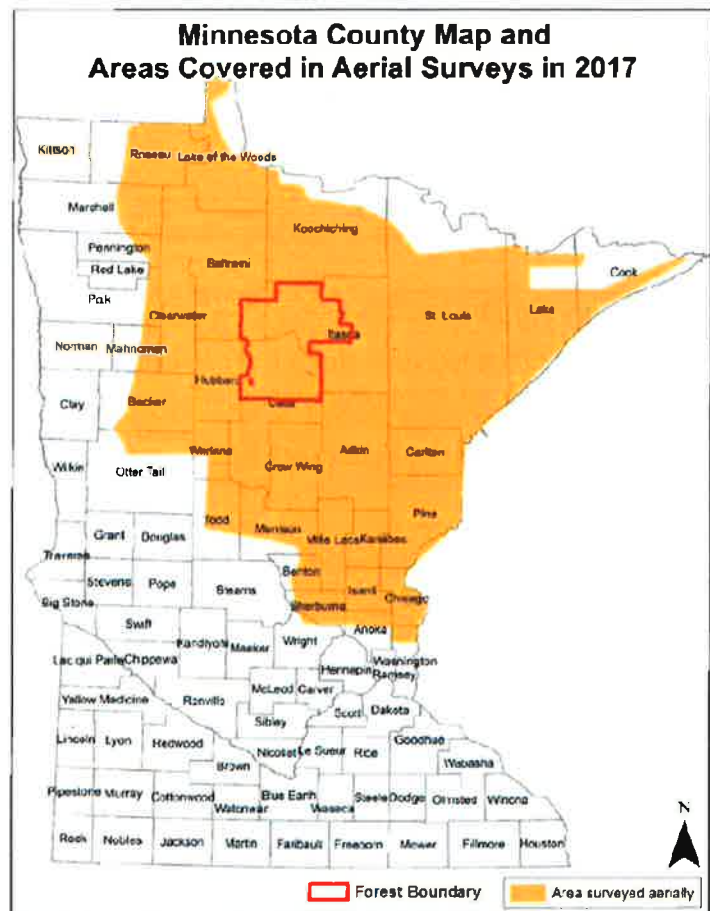
## **References**

Data reports were pulled from Natural Resource Manager (NRM) to provide information regarding number of agreements, dollar amounts and cooperators. Reports used were the GARP010L and GARP006L.

## 4. Insect and Disease

Since the early 1950's, aerial surveys have been a valuable tool for monitoring the status of forest insects and pathogens across the 16 million acres of forest land in Minnesota. For the past fifteen years, these surveys have been accomplished through the partnership of the Minnesota Department of Natural Resources (DNR) Forest Health and Resource Assessment Unit and the Forest Service State and Private Forestry. Aerial sketch maps are digitized, ground-truthed, and made available as a State-wide shapefile. The purpose of this survey is to indicate where significant and highly noticeable tree damage occurred. A second purpose is to monitor general trends in forest health conditions. These data are obtained by the Forest Silviculturist, clipped to the Forest's boundary and summarized for the Forest.

With new personnel in both the DNR, and the Forest Service, some changes are affecting this survey. In 2016 the survey was incomplete due to storms that curtailed flights. This is reflected in the reduced acres of area affected by insects and disease in 2016. Data is displayed but can't be directly compared to 2017.



**Figure 2** Areas covered in aerial surveys for insect and disease tree damage

### Key Points

There is a shift in the species affected, or agents involved. Most notably, damage and mortality has increased for the tamarack forest type. Tamarack continues to be impacted by the larch casebearer and Eastern larch beetle. The larch casebearer which increased over ten-fold from 2016, and seven-fold from 2015, coming in with 8,965 acres in 2017. Eastern larch beetle is a native bark beetle that attacks only larch species. 2017 was a record setting year statewide for acres affected by Eastern larch beetle. Newly affected acres on the Chippewa in 2017 totaled 2,267. In 2016, new acres totaled 1,332.

### Monitoring Question

Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?

### *Last Updated*

The monitoring question is analyzed annually. The analysis is reported biennially.

### *Monitoring Indicator(s)*

Acres of damage by agent; acres of damage by forest type; acres of damage by severity rating. Host, agent and severity.

### *Monitoring Frequency*

Annually

### *Monitoring Driver—Desired Condition and Objectives:*

This monitoring question stems from 36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.

The Forest Plan includes desired conditions and objectives related to insects and disease at:

D-ID-3	D-VG-8	O-VG-13
O-ID-1	O-VG-11	
D-VG-5	O-VG-12	

### *Results*

The Chippewa National Forest's forest health survey results are displayed in table 4 for damage by causal agent, table 5 for damage by forest type, and table 6 and table 7 for severity ratings. New staff in the Department of Natural Resources led to some changes in the data. For example, "decline" was not reported on the Chippewa in 2017, but two new categories ("Blights" and "Hail") may have been counted as "decline" in the past. Some of the increase in "Abiotic" may have also been reported as "decline" in the past.

#### **Larch Casebearer**

The biggest story for 2017 is the larch casebearer which increased over ten-fold from 2016, and seven-fold from 2015, coming in with 8,965 acres in 2017. Larch casebearer is a non-native caterpillar that feeds on tamarack. It first began causing noticeable defoliation on the Forest in 2005. Statewide, most new defoliation in 2017 was concentrated in Cass County, with very little geographic overlap compared to 2016. Factors contributing to larch casebearer outbreaks are unknown, though effects from this insect have continually spread state-wide for several years.

Larch casebearers defoliate trees. Though defoliation is stressful, tamarack can usually tolerate this process for several years before dieback begins to occur. This is because, unlike most conifers, tamarack continue to grow new needles throughout the growing season (indeterminate growth).



Table 4 Damage by causal agent

AGENT NAME	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
Aspen defoliation											5,107			
Forest tent caterpillar	2,220	394	8,638	34,064	207,001	39,053	2,382	399						
Unknown		2,406		48	137	67	520	10	8	1,148	1,685	509	198	3,998
Spruce Budworm	137	936	1,110	263		2	339	73			837			155
Larch casebearer	8,965	820	1,291	1,314	512	667	749	2,787	1,387	785	378	255	351	83
Jack pine budworm										43	222	2,322	1,368	274
Eastern larch beetle	2,267	1,332	1,430	1,109	447	39	266	12	136	416	142	250		
Ash decline					519			593	0	179	102			
Flooding/ Beaver	198	184	144		278	301	147	11	64	30	47	148	258	22
Bark beetles			216	82	2	1	2	30	92			4		
Porcupine Damage													2	13
Two-lined chestnut borer								2	8				341	
Abiotic	982		28										912	
Rx Fire & Wildfire	114			507			91	117	54	79				
Wind Damage	2,202	1,383				4,603			0	1				
Decline			4,787	823	942	1,702	351		883					

AGENT NAME	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
Large Aspen <i>Tortrix</i>									35					
Hail	764													
Blights ( <i>Phomopsis</i> , <i>Sclerophoma</i> , <i>Kabaiana</i> )	1,378													
Dutch elm disease								11						
TOTAL ACRES	19,227	7,455	17,644	38,210	209,838	46,435	4,847	4,045	2,667	2,681	8,520	3,488	3,430	4,545

### Eastern Larch Beetle

Eastern larch beetle is a native bark beetle that attacks only larch species. In 2016, newly affected acres on the Forest totaled 1,332; in 2017 the newly affected acres on the Forest totaled 2,267. Statewide, 2017 was a record setting year for acres affected by eastern larch beetle. Damage from this insect pest was first reported in 2006, with 250 acres on the Forest. The accumulated total acres of damage from eastern larch beetle on the Forest, since 2006, now stands at 7,846.

Eastern larch beetle prefer large mature trees. Damage usually starts out light, with less than 30 percent of the trees in a stand impacted. Eastern larch beetle will continue to work in a stand over several years until mortality of all large trees is complete. Current recommendations by the Minnesota Department of Natural Resources are to manage tamarack stands in order to establish the next generation of trees; "Our best advice for forestland owners who wish to manage their tamarack for timber is to regenerate mature or almost-mature tamarack stands before they are infested by eastern larch beetle. Encourage tree diversity, and don't shy away from promoting tamarack. Larch beetles will generally not attack young tamarack seedlings and saplings." <sup>1</sup> Figure 3 is an aerial view of forests heavily impacted by eastern larch beetle.



A swath of Minnesota's forest heavily impacted by eastern larch beetle.  
Photo by Marc Roberts, USDA Forest Service.

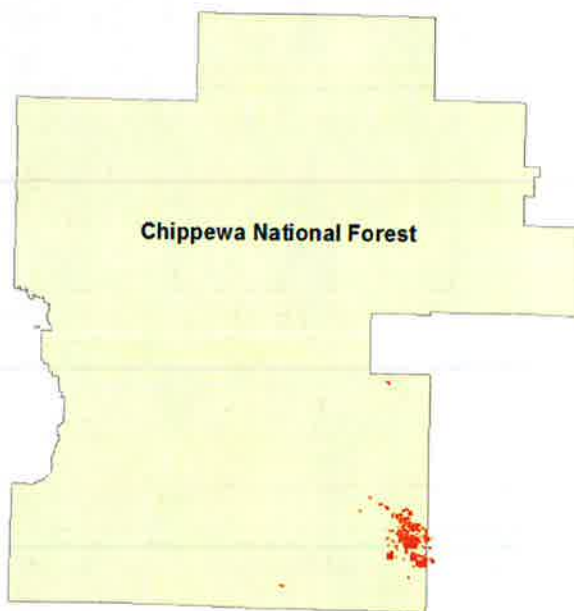
**Figure 3 Eastern larch beetle caused mortality**



## Wind Damage

In 2016-2017 over 3,500 acres were damaged by wind within the Chippewa National Forest. Thunderstorms and heavy rains were common in 2016 during the months of June and July. Similar storms crossed the State during the summer of 2017. The State Climatology Office reports most of this wind damage was from straight line winds associated with thunderstorms.

On the Forest most of the wind damage was in the Remer area of the Deer River District. (See map). Eighty-two percent of the damage was moderate, while 18 percent was severe. All species of trees were involved.



**Wind Damage 2016 & 2017**

**Figure 4 Wind damage**

## Shoot blight on Northern white-cedar

Northern white-cedar has relatively few disease and insect pests, however browsing by white-tailed deer and snowshoe hares can prevent the reestablishment of the type<sup>2,3</sup>, and may be the greatest problem for this species on the Forest. Even so, leaf blight can cause premature leaf browning and shedding. Nearly 1,400 acres of blight was found on Northern white cedar (*Thuja occidentalis*) on the Forest in 2017. Because the species of blight was not confirmed it's not possible to predict what will happen with these infections. There are a dozen stands involved, mostly in the Deer River Ranger District. These will need to be monitored in 2018 to see what happens. Blight infections in white cedar can be promoted by cool wet springs.

## Forest tent caterpillar

Around 2,200 acres of forest tent caterpillar damage were observed on the Forest in 2017. There has been a steady decline in acres affected since a high of 203,000 acres in 2013. A dip in 2016 acres was probably due to incomplete early flights in the survey due to severe weather events. Most of the damage in 2017 was "moderate"; 258 acres were "severe" or "very severe". These were found scattered through the northern part of the Forest. The largest single block of forest tent caterpillar damage on the Forest in 2017 was on Tamarack Point (see map). This area was 275 acre in size and received a "moderate" descriptor.

Aspen that is defoliated by forest tent caterpillar can re-foliate. This process uses energy resources. Multiple defoliations can kill trees. The Minnesota Department of Natural Resources recommends, in areas with repeated



**Figure 5 Largest area of forest tent caterpillar**

heavy defoliation, regenerating aspen stands nearing rotation age.<sup>4</sup>

### Spruce Budworm

Spruce budworm damage was at a low level in 2017 with 137 acres affected in one location, but damage was very severe. This block is in the upcoming Penn North project area and involved white spruce in settings 090301000920080, 090301000920003, 090301000920074 and 090301000920001. These stands should be field checked and treated, possibly clear-cut and regenerated.

### Fire

One hundred fourteen acres were damaged by fire in the 2017 survey. All these acres were in red pine on Oak Point. Unobserved fire damage occurring after aerial survey is complete usually leads to an underestimate of damaged acres each year.

The tables on the following pages display summaries of damage and severity. Table 5 displays the damage by forest type. Tamarack was the forest type most affected, representing 58 percent of newly affected acres, by insect and disease damage in 2017, due to eastern larch beetle and larch casebearer. Another quarter of the acres affected by insects and disease were hardwoods, or hardwoods/softwoods. Half these acres were due to blowdown in the Remer area. The balance was mostly due to forest tent caterpillar. A distant third was aspen, which was primarily affected by abiotic problems.

Table 5 Damage by Forest Type (newly affected acres) for all ownerships within the Forest boundary

HOST FOREST TYPE	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
Aspen	982	593	3,246	274	942	1,641	646	0	769	129	5,107	0	912	656
Balsam Fir/white spruce	137	936	1,260	389	149	7	352	85	1	347	626	42	0	155
Birch			0	0	0	0	0	0	0	0	0	0	0	222
Black Ash			688	550	519	154	225	593	149	179	102	0	0	366
Black Spruce				0	0	0	0	0	0	0	211	0	0	0
Elm				0	0	0	0	11	0	0	0	0	0	0
Hardwoods	2,220	578	9,520	34,064	207,012	39,785	2,382	399	32	640	1,469	411	75	1,736
Jack Pine			0	0	1	0	1	14	35	143	243	2,322	1,346	274
Oaks				0	0	0	0	2	8	0	0	0	342	0
Red Pine	877		37	510	2	317	91	125	110	10	0	13	24	16
Softwoods			174	2	249	521	134	12	32	30	242	141	0	3
Tamarack	11,232	2,152	2,722	2,423	959	706	1,02	2,805	1,522	1,200	519	560	733	696
Unknown	181	1,813		0	0	0	0	0	0	0	0	0	0	423
White pine				0	0	50	0	0	8	0	0	0	0	0
Both Hardwoods & Softwoods	2,220 (mostly wind damage)	1,383	0	0	5	3,254	-	-	-	-	-	-	-	-
Northern white-cedar	1,378													
<b>TOTAL</b>	<b>19,227</b>	<b>7,455</b>	<b>17,647</b>	<b>38,212</b>	<b>209,838</b>	<b>46,435</b>	<b>4,847</b>	<b>4,045</b>	<b>2,667</b>	<b>2,680</b>	<b>8,519</b>	<b>3,489</b>	<b>3,432</b>	<b>4,546</b>

In 2016 the severity ratings for damage changed from four to five categories. Table 6 displays the severity ratings for 2016 and 2017. The percent affected for each of the severity categories changed considerably when compared to changes noted from 2004 through 2015 (table 7)

In both 2016 and 2017, two-thirds of the severity ratings were in the “Moderate” to “Severe” classes, meaning where disease or damage to trees was being seen, 11 percent to 50 percent of a stand was affected by the problem.

**Table 6 Forest damage by severity rating (newly affected acres) 2016 and 2017 for all ownerships within the Forest boundary**

<b>Severity</b>	<b>2017</b>	<b>2016</b>
Very Light (1%-3% affected)	1,080 6%	338 5%
Light (4%-10% affected)	4,820 25%	825 11%
Moderate (11%-29% affected)	9,572 50%	2,838 38%
Severe (30%-50% affected)	32 <1%	2,153 29%
Very Severe (>50% affected)	563 3%	1,250 17%
<b>TOTAL</b>	<b>19,227 100%</b>	<b>7,454 100%</b>

Table 7 Forest damage by severity rating (newly affected acres) 2004 and 2015 for all ownerships within the Forest boundary

Severity	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
Trace (5%-25% affected)	2,932 16%	20,250 53%	187,155 89%	23,383 50%	937 19%	1,862 46%	171 6%	663 25%	2,152 25%	673 19%	257 7%	2,339 51%
Light (26%-50% affected)	1,424 8%	630 2%	1,529 3%	1,313 3%	673 14%	1,095 27%	95 4%	1,299 48%	6,328 74%	541 16%	3,133 91%	1,994 44%
Moderate (51%-75% affected)	11,205 64%	17,307 45%	20,990 10%	16,419 35%	1,893 39%	383 9%	1,382 52%	511 19%	39 <1%	2,246 64%	12 <1%	46 1%
Heavy (>75% affected)	2,085 12%	25 <1%	164 <1%	5,320 11%	1,344 28%	705 17%	1,019 38%	207 8%	0 0%	29 1%	30 1%	167 4%
TOTAL	17,646 100%	38,212 100%	209,838 100%	46,435 100%	4,847 100%	4,045 100%	2,667 100%	2,680 100%	8,519 100%	3,489 100%	3,432 100%	4,546 100%

### Discussion

Over 14 years of monitoring there was one year (2013) that was an anomaly due to a large area (207,012 acres) of damage by forest tent caterpillar. Removing 2013 from the data, the mean area with new damage since 2004 is 13,314 acre. The minimum was 2,667 acres and the maximum was 46,435 acres. So, 19,227 of new damage in 2017 is within the “normal” range for the past 14 years.

What is happening is a shift in the species affected, or agents involved. Most notably, damage and mortality has increased for the tamarack forest type. In 2017, 11,232 acres of tamarack were damaged and dying. Up to 2017, the largest amount of tamarack affected on the Forest was 2,805 acres.

Whatever the cause (i.e., could be climate change) the eastern larch beetle is behaving differently than historically. Throughout the range of tamarack eastern larch beetle is now attacking health trees, where in the past it was more opportunistic, attacking trees that were stressed.



Shoot blight on northern white-cedar (*Thuja occidentalis*) first appeared in 2017 in forest health surveys. “The outbreak has been widespread and severe with 75 percent of the affected acreage statewide having more than a third of the canopy impacted”<sup>5</sup>. Statewide 11,752 acres were affected. Most of these are in proximity to the north side of the Chippewa National Forest. Approximately 1,378 acres were located on National Forest System lands. This appears to be a new issue for northern white-cedar. This species is already in trouble because the Forest is unable to regenerate it due to high deer densities and browsing impacts.

Regarding the Monitoring Question: “*Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?*”

What constitutes a “healthy forest” has not been quantified. Regarding native insects and diseases things are likely to change. The eastern larch beetle is a current example. If the growing season continues to extend, it gives insects opportunity to produce additional generations in a year. Two generations may become common in a season where one generation used to be the norm. Thus, populations will build.

Non-native species is another variable presenting greater risks to forest health. The emerald ash borer has not been detected on the Forest through 2017, but is at the “door step”. The same is true for gypsy moth. Oak wilt is approaching from the south. None of these are native to North America and can cause great disruption in forest systems.

Coupled with these, the Forest is short on young age classes on its landscape. Young trees are more vigorous and resilient.

### *Recommendations*

The Forest Service should implement strategies that allow for rapid response to forest health issues as they occur. Eastern larch beetle may quickly remove the options for natural regeneration of tamarack if the infestation becomes forest-wide. Therefore it is recommended to begin regeneration harvests as soon as eastern larch beetle is detected in an area to take advantage of living trees as seed sources. Though seed-trees may not stand long, it may be long enough to cast seed.

Awareness:

**Forest Health Workshops:** Every winter the Forest Service hosts and coordinates an interagency Forest Health Workshop. Attendance is free, and has grown each year. The 14<sup>th</sup> annual Workshop was held in February, 2018, with over 170 resource managers attending from the Forest Service (Superior and Chippewa National Forests and Northern Research Service Center); Minnesota Department of Natural Resources (forestry, recreation and wildlife); Bureau of Indian Affairs; Red Lake Forestry; Fond du Lac Forestry; Minnesota Department of Agriculture; University of Minnesota; Aitkin, Beltrami, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Itasca, Kanabec, Sherburne Counties; Greg Cook Logging; Potlatch; UPM-Blandin; Minnesota Forestry Association; and several private forestry consultants.

Forest health specialists from USDA State & Private Forestry, the Minnesota Department of Natural Resources, Minnesota Department of Agriculture, and the University of Minnesota made up the cadre. Four category 1 Continuing Forestry Education credits were given to attendees by the Society of American Foresters. Forest Stewardship Plan writers were also given Continuing Education Credits by the University of Minnesota.

## *References*

<sup>1</sup>[https://www.dnr.state.mn.us/treecare/forest\\_health/elb/management.html](https://www.dnr.state.mn.us/treecare/forest_health/elb/management.html)

<sup>2</sup>Johnston, William F. 1977. Manager's handbook for northern white-cedar in the north central States. USDA Forest Service, General Technical Report NC-35. North Central Forest Experiment Station, St. Paul, MN. 18 p.

<sup>3</sup>Fowells, H. A., comp. 1965. Silvics of forest trees of the United States. U.S. Department of Agriculture, Agriculture Handbook 271. Washington, DC. 762 p.

<sup>4</sup>[https://files.dnr.state.mn.us/assistance/backyard/treecare/forest\\_health/annualreports/2017-annual-report.pdf](https://files.dnr.state.mn.us/assistance/backyard/treecare/forest_health/annualreports/2017-annual-report.pdf)

<sup>5</sup>MnDNR, Division of Forestry, Forest Health Unit, 2017, Forest Health Annual Report

## 5. Landscape Ecosystems and Ecological Conditions and Vegetation

The Landscape Ecosystems and Ecological Conditions and the various Vegetation monitoring questions focus on the vegetative conditions within the National Forest System lands. These are addressed together since they share many of the same indicators.

### National Forest System lands and Leech Lake Reservation

- With the exception of the Dry Pine Landscape Ecosystem, the Forest is below the Decade 2 objectives for the amount of 0-9 age class even with the blowdown event of 2012. This trend continues well into Decade 2 (2021) which takes into consideration treatments that are planned and under decision but have yet to be harvested. This trend holds true for all the LEs. The focus on commercial thinning of red pine stands contributes in part to these results.
- The amount of mature/older forest on the landscape has steadily increased since 2003. However, results vary by LE as to whether MIH objectives to increase, maintain, or decrease mature and older forest are being met.
- Jack pine and spruce-fir forest types are well below decadal objectives and contribute to an overall decline in the amount of conifer on the landscape.
- Amount of aspen on the landscape has declined since 2003 yet still exceeds the objectives for all LEs. Additional decreases in aspen are desired.
- Northern hardwoods exceed objectives due to stand re-delineation and typing and recent stand data. Further increases in this forest type are expected due to regeneration treatments, particularly in aspen stands, that promote the release of young hardwoods in stands.

### Monitoring Questions

Landscape Ecosystems and Ecological Conditions:

1. To what extent is the Forest meeting vegetation composition and age class objectives for each of the Landscape Ecosystems?

Vegetation

2. To what extent is the Forest providing a full range of vegetative communities that address diverse public interests and needs while contributing to ecosystem sustainability and biological diversity?

Vegetation Composition & Structure

3. To what extent are conditions moving toward short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?

Vegetation Ecological Conditions

4. To what extent is Forest management contributing to the maintenance and establishment of white pine in appropriate landscape ecosystems?

Vegetation Spatial Patterns

5. To what extent is Forest management, natural disturbances, and subsequent recovery restoring vegetation spatial landscape patterns and moving conditions toward both short-term (1-15 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?

### *Monitoring Indicators*

#### Landscape Ecosystems and Ecological Conditions:

1. Current species composition and age class by LE compared to objectives.

#### Vegetation

2. Current vegetation composition, age class and MIH by LE compared to objectives.

#### Vegetation Composition & Structure

3. Species composition, age class, and MIH objectives by LE compared to FP objectives. Analysis by MA. May include discussion of patch quality.

#### Vegetation Ecological Conditions

4. .1 - Acres and percent of white pine forest type by landscape ecosystem  
.2 - Amount of white pine as a component of other forest types based on frequency in regeneration and non-regeneration plots

#### Vegetation Spatial Patterns

5. Acres and number of temporary openings > 40 acres, > 300 acres, created by even-aged harvest. May also include openings created by natural events such as wind or fire.

### *Monitoring Frequency*

Annually for the Vegetation Ecological Conditions question pertaining to white pine; every 2 years for the remaining questions.

### *Background Drivers*

These monitoring questions stem from 36 CFR 219.12 (a)(5)(ii). The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.

The Forest Plan provides desired conditions, objectives, standards and guidelines pertaining to landscape ecosystems and ecological conditions and vegetation direction:

D-VG-1 through 6

S-VG-2

O-VG-1 through 24

G-VG-1

### *Results*

Section A. presents summaries of Forest-wide figures for the 0-9 and mature /older age classes. Section B. presents a summary of forest types and trends. More detailed information on species composition and age classes for each of the Landscape Ecosystems (LEs) is contained in Section C.

Numbers were calculated in November 2016 based on data in FACTS (corporate database) and stand data. Decade 1 ended in 2014, 10 years after signing of the 2004 Forest Plan Revision. Decade 2 spans 2015-2024.

## **A. Summary of young (0-9) and mature/older age classes**

Numbers for young (0-9) were calculated based on harvest activities recorded in our database. In instances where the harvest was clearcut or coppice, age class is set back to "0" and these acres then contribute to the 0-9 age class. Stands with a basal area of 50 sq. ft. or greater did not contribute to the 0-9 age class.

All planned but unaccomplished harvests were assumed to be completed in 5 years – by 2021.

The July 2012 windstorm created a pulse of 0-9 due to extensive damage in some stands that was followed by salvage harvest. In addition, all stands with more 60 percent damage that were not harvested were assigned to the 0-9 age class for this analysis.

Acres of mature and older have increased since 2004. Age class tables for each LE, presented later in Section C., provide more detail on LEs with shortages and surpluses.

Acres and percentages may not be accurate if databases are not up to date and reflect the amount of even-aged regeneration harvest completed.

The following data and discussion is for uplands because there has been minimal harvest activity in lowlands.

Table 8 Summary of 0-9 age class objectives for uplands by LE

Landscape Ecosystem Uplands	LE Total (acres)	LE LLR (acres)	0-9 Age Class in 2003 NFS (acres)	0-9 Age Class in 2003 LLR (acres)	0-9 % LLR	0-9 Age Class NFS 2017 (acres)	0-9 % NFS	0-9 Age Class LLR 2017 (acres)	NEPA Decisions Through 2022 (NFS acres)	0-9 % NFS	Objective Decade 2 %
Dry Pine	12,300	9,701	1,800	1,568	16	1,118	9	999	437	4	10
Dry Mesic Pine	82,300	30,249	6,800	3,271	11	3,402	4	2,139	3,524	4	9
Dry Mesic Pine Oak	157,800	105,786	12,700	9,467	9	7,599	5	5,702	6,321	4	9
Boreal Hdwd Conifer	100,100	25,954	8,900	2,355	9	5,972	6	1,816	5,936	6	10
Mesic No. Hdwd	65,000	22,577	5,300	2,039	9	1,978	3	520	1,249	2	6
Tamarack Swamp	19,400	12,744	1,200	94	1	502	3	348	541	3	8
White Cedar Swamp	12,900	225	1,400	168	75	460	4	0	405	3	6
<b>Total</b>	<b>449,800</b>	<b>207,236</b>	<b>38,000</b>	<b>18,962</b>	<b>9</b>	<b>21,031</b>	<b>5</b>	<b>11,524</b>	<b>18,413</b>	<b>4</b>	<b>8</b>

Objectives taken from FP, pp. 2-59 through 2-79. 11/2016

## Results

- For the 3 largest LEs: Dry Mesic Pine, Dry Mesic Pine Oak, and Boreal Hardwood Conifer, the 2004 Forest Plan projected for Decade 2 as much or more than the 2003 numbers for 0-9. The 2003 numbers reflect 1986 Forest Plan direction which was heavy to clearcutting.
- In spite of the 2012 blowdown event, the amount of 0-9 decreased for all LEs since 2003. Without the blowdown, the departure would have been even greater.
- In 2017, the total of 0-9 is roughly 4.7 percent of the total forest upland acres compared to the Forest Plan projected amount of 8 percent.

- For 2021, over half way through Decade 2, the amount of 0-9 is projected to be below objectives for Decade 2. Even so, this is an improvement over the amount of 0-9 in 2017. Mesic Northern Hardwood, Tamarack Swamp, and White Cedar Swamp are anticipated to greatest departure from Forest Plan Decade 2 Objectives.

Table 9 Summary for upland forest for mature and older forest by LE

Landscape Ecosystem Uplands	LE Total acres	2003 Upland Mature NFS (acres)	2003 Upland Mature LLR (acres)	2017 Upland Mature NFS (acres)	2017 Upland Mature LLR (acres)	2022 Anticipated Upland Mature (acres)
Dry Pine	12,300	4,400	3,282	5,385	3,877	5,713
Dry Mesic Pine	82,300	43,000	14,683	46,352	15,032	49,541
Dry Mesic Pine Oak	157,800	82,600	57,083	88,740	61,022	95,205
Boreal Hdwd Conifer	100,100	40,600	11,820	45,274	13,376	47,133
Mesic No. Hdwd	65,000	35,300	14,423	39,436	15,164	41,751
Tamarack Swamp	19,400	8,200	4,572	10,915	6,140	11,382
White Cedar Swamp	12,900	2,900	40	3,212	40	3,479
<b>Total</b>	<b>449,800</b>	<b>217,000</b>	<b>110,475</b>	<b>239,314</b>	<b>114,651</b>	<b>254,204</b>

Numbers were from MIH summaries by LE for young, sapling, mature and old. NFS LLR 11/2016

## Results

- For mature and older (table 9), acres were taken from Management Indicator Habitat (MIH) outputs for each of the LEs. Generally, for upland conifers (red, white, spruce/fir) and aspen, mature and older stands are 50 years or older. The exception is jack pine which is considered to be mature at age 40. Upland northern hardwood stands are considered to be mature at age 60. (Forest Plan, Table APP-C2, pg. C-2). Age class tables for each LE presented later provide more detail.
- Mature and older has increased by 11,000 acres since 2003 and is expected to increase by another 9,000 acres in the next five years.
- Results vary by LE as to whether MIH objectives to increase, maintain, or decrease mature and older forest are being met for each of the Management Indicator Habitats.

## B. Summary of Forest types

Table 10 provides a summary for each of the major forest types. It includes a summary of the acres in the 0-9 and the mature and older age classes, and the total forest type acres in 2004, 2017, and projected decadal acres. Some key points are highlighted in the "Trends for Forest Type" column.

### Results

- Overall upland conifer which is comprised of jack pine, red and white pine, and spruce-fir has decreased on the Forest landscape. Decreases in jack pine and spruce-fir are opposite the objectives to increase acres. Acres of red and white pine (combined) have been consistent but an increase is desired. The amount of young conifer in each of these forest types has declined since revision.
- The amount of aspen is decreasing; further decreases are desired.
- Northern hardwood acres have increased substantially and exceed decadal objectives due to succession, re-typing forested stands, and recent stand data. Further increases are expected. This trend was not projected in the Forest Plan.
- Jack pine, spruce-fir, and aspen are projected to decrease on the landscape according to climate change models which is not reflected in our Forest Plan

Table 10 Summary of Forest type acres and trends

Forest Type		2004 NFS acres	2004 LLR acres	2017 NFS acres	2017 LLR acres	Decade 2 objective	Trends for Forest Type
Jack Pine	0-9	5,100	3,521	1,370	907		Downward trend in acres since 2004 At less than half of decadal objectives for acres
	Mature/older	7,700	5,155	2,875	1,586		
	Total acres	14,500	10,231	9,292	6,210	23,300	
Red & White Pine	0-9	3,800	2,508	2,561	2,149		0-9 acres fairly consistent since 2004 Total acres well below decadal objectives
	Mature/older	41,000	30,945	54,092	39,117		
	Total acres	77,200	56,508	78,861	56,847	90,000	
Upland spruce-fir	0-9	3,400	859	608	182		Downward trend in acres since 2004 & well below decadal objectives FEIS projects low levels of 0-9
	Mature/older	12,000	4,721	7,747	2,045		
	Total acres	22,300	10,609	18,225	5,120	37,100	



Aspen-birch	0-9		38,600	11,612	14,036	6,690	Decrease in both 0-9 and mature/older since 2004 as desired	
	Mature/older		101,000	33,639	88,833	30,311		
	Total acres		264,700	90,870	242,233	83,866	214,700	
Northern Hardwoods	0-9		1500	980	2,452	1,591	Currently exceeds decadal objectives Expect future increases due to aspen conversion to hardwoods	
	Mature/older		55,000	31,442	86,629	42,324		
	Total acres		60,000	34,652	98,701	49,282	69,000	
Upland Conifer	0-9			6,888	4,539	3,238	The 0-9 upland conifer makes up 1.3% of upland forest acres in 0-9. At the time of FP revision, 0-9 upland conifer was approximately 2.1% of all upland forest on the Chippewa (FEIS, 3-3.1-10). Mature/old upland conifer is 24% of upland forest, an increase from 13.9% at the time of revision (FEIS, 3-3.1-10).	
	Mature/older			40,819	64,715	42,748		
	Total acres			77,347	106,387	68,177		
Upland Forest	0-9			19,479	21,026	11,519	About 5% in 0-9 age class Approx. 51% of upland forest acres are in the mature and older age class	
	Mature/older			105,903	240,177	115,382		
	Total acres			202,868	447,313	201,325		

Numbers are based on 2016 Management Indicator Habitat tables by Landscape Ecosystem for young, sapling, mature, and older acres. Decade 2 objectives were calculated based on Table DLP-2 (FP, p 2-57).

### Species Composition and Age Class objectives by Landscape Ecosystem

Species composition and age class acres and percentages for 2016 are compared to Decade 2 objectives for each Landscape Ecosystem. The 2003 numbers are taken from tables in the Forest Plan on pages 2-60 through 2-74 and are included to provide a context for the shift and trends since the 2004 Forest Plan went into effect. The 2016 acres and percentages reflect what is accomplished and on the ground. For the age class tables, the 2021 column captures acres planned for harvest that are yet to be accomplished. It is assumed they will be accomplished in 5 years. Lowlands are not discussed because so little harvest has occurred in them. Shifts in all forest types tend to be a function of succession, re-typing, and stand inventory rather than active management.

### Dry Pine Landscape Ecosystem

Table 11 Dry Pine Species acres and percent

Forest Type	FP 2003 acres	FP 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	Objective Decade 2 %
UPLANDS									
Jack Pine	3,300	27	3119	33	2,107	18	1,946	21	41
Red Pine	4,900	41	4498	48	5,164	43	4,702	51	37
White Pine	200	1	78	1	341	3	238	3	2
Spruce-fir	200	1	94	1	132	1	58	1	2
Oak	400	3	120	1	463	4	216	2	3
Northern Hdwds	100	1	34	0	474	4	122	1	1
Aspen	2,700	23	1162	12	2,927	24	1,653	18	12
Paper Birch	300	2	213	2	359	3	199	2	2
TOTAL	12,100	100	9317		11,967	100	9,134	100	100
LOWLANDS									
Black Spruce	300	71	301	78	56	15	54	17	71
Tamarack	100	13	31	8	64	18	56	17	13
Lowland Hdwds	100	13	45	12	18	5	18	6	13
White Cedar	<100	3	7	2	227	62	194	60	3
TOTAL	400	100	384	100	365	100	322	35	100

The Dry Pine LE is the smallest LE on the Forest containing the smallest amount of upland acres of any of the LE's.

Table 12 Dry Pine LE Age class composition in acres and percentages

Cover	Age Class	NFS 2003 acres	NFS 2003 %	LLR 2003	NFS 2017 Acres	LLR 2017 Acres	NFS DP %	LLR DP %	NFS NEPA Decision s 2022 Acres	NFS 2022 %	Objective Decade 2
Uplands-Lowlands	0-9	1,800	14	1,568	1,118	999	9	11	437	4	10
Uplands-Lowlands	10-39	5,000	40	3,846	4,626	3,634	38	38	4,503	37	45
Uplands-Lowlands	40-79	4,700	37	3,643	3,664	2,797	30	30	4,289	35	28
Uplands-Lowlands	80-179	1,100	8	644	2,921	2,024	24	21	3,098	25	17
Uplands-Lowlands	180+	0	0		3		0		4	0	0
TOTAL		12,500	100	9701	12,332	9,454	100	100	12,329	100	100

To meet objectives:

- Increase jack pine acres which can only be accomplished by conversions of red pine, paper birch and aspen to jack pine.
- Decrease aspen. Converting these acres to jack pine would be ideal but this is economically and technically difficult to accomplish.
- The 0-9 age class was met for Decade 1 primarily because of the July 2012 blowdown event. The amount of 0-9 declines by 2021 yet would meet the Decade 2 objectives.
- The 80-179 age class tends to be over-represented.

Table 13 Dry Pine LE MIH age classes 2003

Dry Pine	NFS	LLR	NFS*	LLR	Sapling	NFS	LLR	Mature	NFS	LLR	Old	NFS	LLR	total all ages
MIH	Young	Young	Sapling	Young	Sapling	Mature	Mature	Mature	Old	Old	Old	total all ages	total all ages	total all ages
Upland Forest	2,200	1568	--	4468	896	1,300	476	1,700	1591	1,700	1591	9,318	9,318	9,318
Upland Deciduous	500	122	--	896	56	100	93	100	35	100	35	1,529	1,529	1,529
Northern Hardwood	0	0	--	840	82	0	12	0	0	0	0	154	154	154
Aspen-Birch	500	122	--	3572	82	0	12	100	29	100	29	1,374	1,374	1,374
Upland Conifer	1,700	1445	--	82	0	0	0	1,600	1556	1,600	1556	7,788	7,788	7,788
Upland Spruce-Fir	0	0	--	3278	211	1,200	1117	100	29	100	29	948	948	948
Red and White Pine	300	151	--	211	86	200	86	1,500	1528	1,500	1528	4,575	4,575	4,575
Jack Pine	1,400	1294	--	53	0	200	202	100	77	100	77	3,119	3,119	3,119
Lowland Black Spruce-Tamarack	0	0	--	53	0	200	202	100	77	100	77	332	332	332

\*the 2004 Forest Plan did not include sapling information

Table 14 Dry Pine LE MIH age classes 2017

Dry Pine	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR
MIH	Young	Young	Sapling	Sapling	Mature	Mature	Old	Old	Old	total all ages	total all ages	total all ages
Upland Forest	1,111	992	5,472	4,264	4,388	3,297	997	580	11,968	9,133		
Upland Deciduous	449	344	1,673	719	1,627	957	474	170	4,223	2,190		
Northern Hardwood	40	3	122	58	704	276	71	0	937	337		
Aspen-Birch	408	341	1,552	661	923	680	403	170	3,286	1,852		
Upland Conifer	662	648	3,798	3,545	2,761	2,341	524	410	7,745	6,944		
Upland Spruce-Fir	0	0	63	43	29	10	40	5	132	58		
Red and White Pine	310	296	2,423	2,292	2,709	2,309	63	43	5,505	4,940		
Jack Pine	352	352	1,312	1,209	22	22	421	362	2,107	1,945		
Lowland Black Spruce-Tamarack	0	0	24	24	91	81	5	5	120	110		

*Dry-Mesic Pine Landscape Ecosystem*

Table 15 Dry Mesic Pine Species acres and percent

Forest Type	FP 2003 acres	FP 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	Objective Decade 2 (%)
UPLANDS									
Jack Pine	1200	1	256	1	630	1	209	1	1
Red Pine	13000	15	5644	19	12,212	15	5,086	17	16
White Pine	800	1	405	1	1,049	1	571	2	6
Spruce-fir	4000	5	1445	5	2,629	3	815	3	9
Oak	5100	6	2551	8	3,874	5	1,505	5	6
Northern Hdwds	12300	15	4403	15	19,452	24	7,559	25	15
Aspen	38800	46	12206	40	36,574	44	11,641	39	37
Paper Birch	9100	11	3339	11	6,067	7	2,303	8	10
TOTAL	84,300	100	30249	100	82,487	100	29,689	100	100
LOWLANDS									
Black Spruce	3600	53	843	44	2669	36	462	22	53
Tamarack	600	9	206	11	759	10	196	9	9
Lowland Hdwds	1600	24	529	27	2196	30	863	42	24
White Cedar	900	13	356	18	1752	24	549	27	13
TOTAL	6700	100	1935	100	7375	100	2070	100	100

Table 16 Dry Mesic Pine Age class composition in acres and percentages

Age Class	NFS 2003 Acres	NFS 2003 %	LLR 2003 Acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 Acres	LLR 2017 %	NFS NEPA decision 2022	NFS 2022 %	NFS Objective decade 2
UPLANDS											
0-9	6800	8	3271	11	3,402	4	2139	7	3524	4	9
10-39	29900	36	10282	34	22270	27	7971	27	20932	25	40
40-79	29700	35	10230	34	24558	30	9982	34	23723	29	22
80-179	17800	21	6451	21	32212	39	9571	32	34263	42	29
180+	<100	0	13	0	47	0	25	0	47	0	0
TOTAL	84,300	100	30249	100	82489	100	29688	100	82489	100	100
LOWLANDS											
0-9	<100	0	4	0	34	0	26	1	49	1	4
10-39	300	4	49	3	325	5	81	4	286	4	5
40-79	1200	18	365	19	1071	15	354	17	888	12	5
80-119	3800	57	1109	57	3740	52	1115	54	3524	49	45
120-179	1300	19	375	19	1820	25	415	20	2240	31	38
180+	100	1	34	2	160	2	71	3	161	2	2
TOTAL	6700	100	1935	100	7150	100	2062	100	7148	100	100

To meet objectives:

- The largest species shifts need to be increased in spruce-fir, white pine, and paper birch acres.
- Both the northern hardwoods and aspen exceed objectives. Aspen acres will require substantial decreases through conversions to meet decadal objectives.
- Increases are needed in the upland 0-9 age class which can only be accomplished through even-aged harvest.
- The 80-179 age class increased substantially by 2016 and even more so by 2021, almost doubling the number of acres since 2003.
- Acres exceed objectives in the 40-79 and 80-179 age group.

Table 17 Dry Mesic Pine LE MIH age classes 2003

Dry Mesic Pine	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	total all ages
MIH	Young	Young	Sapling	Sapling	Mature	Mature	Old	Old	Old	Old	Old	Old	total all ages
Upland Forest	9,500	3271	--	--	12294	35200	12181	7800	2502	30248			30248
Upland Deciduous	8200	2908	--	--	7277	28300	9937	6800	2377	22499			22499
Northern Hardwood	600	474	--	--	236	10500	5694	800	549	6953			6953
Aspen-Birch	7200	2433	--	--	7041	13700	4243	5600	1828	15545			15545
Upland Conifer	1200	364	--	--	5018	6900	2244	1000	125	7751			7751
Upland Spruce-Fir	500	153	--	--	1039	1200	240	200	13	1445			1445
Red and White Pine	400	117	--	--	3894	5600	1992	100	45	6048			6048
Jack Pine	300	93	--	--	85	200	11	700	68	257			257
Lowland Black Spruce-Tamarack	100	27	--	--	60	3000	726	800	237	1050			1050

Table 18 Dry Mesic Pine LE MIH age classes 2017

Dry Mesic Pine	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	NFS	LLR	total all ages
MIH	Young	Young	Sapling	Sapling	Mature	Mature	Old	Old	Old	Old	Old	Old	total all ages
Upland Forest	3402	2139	32735	12516	32872	11852	13480	3180	29687	29687			29687
Upland Deciduous	3007	1907	26472	9599	24323	8649	12165	2852	23007	23007			23007
Northern Hardwood	816	614	2530	1325	19020	6811	961	314	9064	9064			9064
Aspen-Birch	2191	1292	23943	8275	5304	1838	11204	2538	13943	13943			13943
Upland Conifer	394	232	6263	2917	8549	3203	1314	328	6680	6680			6680
Upland Spruce-Fir	69	47	1454	495	746	226	361	48	816	816			816
Red and White Pine	238	163	4583	2303	7770	2977	669	214	5657	5657			5657
Jack Pine	86	23	226	119	33	0	285	67	209	209			209
Lowland Black Spruce-Tamarack	3	3	340	97	1876	446	747	100	646	646			646



*Dry-Mesic- Pine/Oak Landscape Ecosystem*

Table 19 Dry-Mesic- Pine/Oak MPO Species acres and percent

Forest Type	FP 2003 acres	FP 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	Objective Decade 2 %
UPLANDS									
Jack Pine	9200	6	6618	6	5944	4	3839	4	11
Red Pine	48900	30	40563	38	49028	31	40774	40	33
White Pine	2500	2	2226	2	2911	2	2456	2	2
Spruce-fir	7000	4	3903	4	4618	3	2093	2	4
Oak	2900	2	2266	2	4842	3	3603	3	2
Northern Hdwds	13300	8	8135	8	18245	12	11284	11	11
Aspen	65700	40	32876	31	61883	39	32309	31	30
Paper Birch	13700	8	9199	9	10704	7	6648	4	7
TOTAL	163,200	100	105786	100	158175	100	103,006	100	100
LOWLANDS									
Black Spruce	10100	52	5537	47	6939	35	3978	33	52
Tamarack	2800	15	1990	17	3436	17	2436	20	15
Lowland Hdwds	3500	18	2377	20	3570	18	2320	19	18
White Cedar	2900	15	1791	15	5979	30	3168	27	15
TOTAL	19,200	100	11695	100	19924	100	11902	100	100

Table 20 Dry-Mesic- Pine/Oak Age class composition in acres and percentages.

Age class	NFS 2003 Acres	NFS 2003 %	LLR 2003 Acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 Acres	LLR 2017 %	NFS NEPA decision 2022	NFS 2022 %	Objective decade 2
UPLANDS											
0-9	12700	8	9467	9	7599	5	5702	6	6321	4	9
10-39	58400	36	34152	32	42736	27	25044	24	39414	25	34
40-79	45600	28	28191	27	50942	32	33110	32	51584	33	25
80-119	41500	25	29737	28	47496	30	31262	30	48147	30	24
120-179	4400	3	3896	4	8522	5	7354	7	11599	7	8
180+	700	0	341	0	879	1	536	1	1109	1	1
TOTAL	163,200	100	105786	100	158174	100	103008	100	158174	100	100
LOWLANDS											
0-9	100	1	70	1	91	0	49	0	106	1	3
10-39	800	4	497	4	864	4	557	5	714	4	5
40-79	3300	17	2050	18	3706	19	2209	19	3128	16	6
80-119	11200	58	7015	60	8347	42	4674	39	7840	39	38
120-179	3600	19	2030	17	6787	34	4339	36	7827	39	46
180+	100	1	34	0	129	1	74	1	307	2	2
TOTAL	19,200	100	11,695	100	19924	100	11902	100	19922	100	100

## To meet objectives:

- ◆ Increase upland jack pine acres to more than double the existing amount. This is difficult and expensive to accomplish given that surpluses are in aspen.
- ◆ Increase upland red pine and spruce-fir.
- ◆ Decrease upland aspen.
- ◆ Continue to increase the upland 0-9 age class.
- ◆ Decrease the upland 40-79 age class acres.

- ◆ Closely evaluate the amount of upland 80-119 during project development. Projected amounts are close to objectives and are needed to contribute to the 120-179 age class.

Table 21 2003 Dry-Mesic- Pine/Oak MIH

DMPO MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	17500	9467	--	39235	63000	42980	19600	14103
Upland Deciduous	11200	4738	--	21922	32800	18159	11500	7657
Northern Hardwood	300	165	--	925	10800	7959	1100	1352
Aspen-Birch	10800	4574	--	20997	19700	10200	9900	6305
Upland Conifer	6300	4729	--	17314	30200	24821	8100	6446
Upland Spruce-Fir	700	503	--	1966	2300	1236	300	199
Red and White Pine	2600	2173	--	14112	27300	23253	3500	3252
Jack Pine	3000	2054	--	1236	600	333	4300	2995
Lowland Black Spruce-Tamarack	300	116	--	758	9500	5712	1800	940

Table 22 2017 Dry-Mesic- Pine/Oak MIH

DMPO MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	7599	5702	61836	36283	61160	44368	27580	16654
Upland Deciduous	4876	3533	43567	23063	29586	18181	17646	9068
Northern Hardwood	837	608	3787	2260	16293	10331	2170	1689
Aspen-Birch	4039	2925	39780	20803	13292	7850	15476	7379
Upland Conifer	2723	2170	18269	13220	31574	26187	9934	7585
Upland Spruce-Fir	123	77	2487	1044	1044	552	963	420
Red and White Pine	1729	1561	12664	9930	30330	25495	7215	6243
Jack Pine	871	532	3118	2246	200	140	1755	922
Lowland Black Spruce-Tamarack	99	67	1396	783	5758	3483	3122	2080

*Boreal Hardwood/Conifer Landscape Ecosystem*

Table 23 Boreal Hardwood/Conifer Species acres and percent

Forest Type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003%	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017%	NFS Objective Decade 2
Uplands									
Jack Pine	500	0	79	0	392	0	48	0	0
Red Pine	3700	4	680	3	3649	4	710	3	4
White Pine	600	1	370	1	564	1	261	1	4
Spruce-fir	11000	11	3031	12	6734	7	984	4	13
Oak	100	0	54	0	594	1	255	1	0
Northern Hdwds	11800	11	5267	20	18335	18	8368	33	13
Aspen	68400	66	14711	57	64523	65	13640	53	60
Paper Birch	6900	7	1762	7	5186	5	1379	5	6
TOTAL	102,900	100	25954	100	99977	100	25645	100	100
LOWLANDS									
Black Spruce	14800	49	2136	33	11725	38	1406	23	49
Tamarack	2400	8	481	7	2891	9	362	6	8
Lowland Hdwds	9800	32	2841	44	11084	36	3035	50	32
White Cedar	3300	11	966	15	5016	16	1255	21	11
TOTAL	30,300	100	6423	100	30716	100	6058	100	100

Table 24 Boreal Hardwood/Conifer Age class composition in acres and percentages

Age Class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	NFS NEPA decision 2022 acres	NFS 2022 %	NFS Objective Decade 2
UPLANDS											
0-9	8900	9	2355	9	5972	6	1816	7	5936	6	10
10-39	48700	47	10795	42	37183	37	7360	29	34419	34	45
40-79	28800	28	7024	27	28244	28	8194	32	28601	29	23
80-179	16500	16	5781	22	28521	29	8219	32	30965	31	22
180+	0	0			57	0	55	0	57	0	0
TOTAL	102,900	100	25954	100	99977	100	25644	100	99978	100	100
LOWLANDS											
0-9	200	1	31	0	262	1	111	2	567	2	4
10-39	1400	5	287	4	1440	5	153	3	1386	5	8
40-79	5100	17	1270	20	3428	11	792	13	2124	7	4
80-119	16800	56	3339	52	14635	48	3096	51	13126	43	40
120-179	6500	22	1433	22	10436	34	1686	28	12950	42	42
180+	200	1	62	1	514	2	220	4	564	2	2
TOTAL	30,300	100	6423	100	30715	100	6058	100	30717	100	100

## To meet objectives:

- ◆ Increase upland white pine and spruce-fir.
- ◆ Decrease aspen. Convert to white pine or spruce/fir where feasible.
- ◆ Upland northern hardwoods are over-represented.
- ◆ Increase upland 0-9 age class which is below decadal objectives.
- ◆ Decreases in the 40-79 and the 80-179 age classes are needed to meet Decade 2 objectives.

Table 25 2003 Boreal Hardwood/Conifer MIH

BHC MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	12000	2355	--	11780	33000	9445	7600	2375
Upland Deciduous	10600	2151	--	10073	26800	7651	6700	1918
Northern Hardwood	200	110	--	206	10200	4468	900	538
Aspen-Birch	10400	2042	--	9867	16600	3184	5700	1381
Upland Conifer	1400	204	--	1707	6200	1793	900	456
Upland Spruce-Fir	1000	130	--	1051	4600	1543	500	307
Red and White Pine	100	19	--	652	1600	250	200	129
Jack Pine	300	55	--	4	0	0	200	20
Lowland Black Spruce-Tamarack	900	62	--	180	12200	1849	3100	526

Table 26 2017 Boreal Hardwood/Conifer MIH

BHC MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	5972	1816	48731	10452	29624	9858	15650	3518
Upland Deciduous	5472	1763	43359	9372	25168	9303	14639	3204
Northern Hardwood	342	84	1173	569	14827	6936	2587	1035
Aspen-Birch	5130	1679	42186	8804	10341	2367	12051	2169
Upland Conifer	500	53	5372	1080	4455	556	1012	314
Upland Spruce-Fir	329	49	3807	598	1865	177	733	159
Red and White Pine	112	4	1289	442	2585	375	228	150
Jack Pine	60	0	276	40	6	4	51	5
Lowland Black Spruce-Tamarack	266	43	1294	93	8156	1133	4900	499

*Mesic Northern Hardwood Landscape Ecosystem*

Table 27 Mesic Northern Hardwood Species acres and percent

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	NFS Objective Decade 2
UPLANDS									
Jack Pine	100	0	3		36	0	22	0	0
Red Pine	2100	3	673	3	1992	3	498	2	3
White Pine	500	1	296	1	398	1	262	1	1
Spruce-fir	4000	6	1516	7	2192	3	593	3	7
Oak	800	1	324	1	1039	2	216	1	1
Northern Hdws	20300	31	9997	44	26742	41	13048	58	37
Aspen	32000	48	7924	35	28385	44	6390	29	43
Paper Birch	6800	10	1844	8	4413	7	1301	6	8
TOTAL	66,400	100	22577		65197	100	22330	100	100
LOWLANDS									
Black Spruce	3100	52	425	34	2220	37	326	25	52
Tamarack	500	8	148	12	568	9	140	11	8
Lowland Hdws	1900	31	455	36	2192	36	431	33	31
White Cedar	500	9	239	19	1029	17	396	31	9
TOTAL	6000	100	1267	100	6009	100	1293	100	100

Table 28 Mesic Northern Hardwood Age class composition in acres and percentages

Age Class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	NFS NEPA Dec 2022 acres	NFS 2022 %	NFS Objective Decade 2
UPLANDS											
0-9	5300	8	2039	9	1978	3	520	3	1249	3	6
10-39	2200	33	5079	22	16871	26	4610	21	14840	26	28
40-79	24300	37	8457	37	18216	28	5958	27	17597	28	26
80-119	12800	19	5838	26	24632	38	9164	41	26750	38	33
120-189	2000	3	1072	5	3368	5	1965	9	4604	5	8
190+	100	0	91	0	130	0	113	1	155	0	0
TOTAL	66,400	100	22577	100	65195	100	22330	100	65195	100	100
LOWLANDS											
0-9	<100	0	14	1	65	1	36	3	13	1	2
10-39	100	2	263	21	116	2	47	4	147	2	2
40-79	1400	23	530	42	799	13	81	6	665	13	6
80-119	3300	55	453	36	3392	56	773	60	3282	56	51
120-179	1200	20	7	1	1596	27	344	27	1819	27	39
180+	<100	0	14	1	41	1	13	1	83	1	1
TOTAL	6100	100	1267	100	6009	100	1294	100	6009	100	100

To meet objectives:

- ◆ Increase spruce-fir and decrease aspen.
- ◆ Increase 0-9 age class which is below decadal objectives even with the 2012 blowdown event.
- ◆ Decrease the 80-119 age class through regeneration harvest although some of this is needed to provide ingrowth into the 120-189 age class to meet Decade 2 objectives.



Table 29 2003 Mesic Northern Hardwood MIH ages

MNH MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	7200	2039	--	6115	30500	12221	4800	2202
Upland Deciduous	6800	1989	--	4693	29100	11558	4300	1848
Northern Hardwood	300	149	--	494	17300	8649	1700	1029
Aspen-Birch	6500	1840	--	4200	11100	2909	2600	819
Upland Conifer	300	50	--	1421	1400	663	500	354
Upland Spruce-Fir	200	11	--	766	1000	514	300	225
Red and White Pine	200	39	--	655	400	146	200	129
Jack Pine	0	0	--	0	0	3	0	0
Lowland Black Spruce-Tamarack	0	0	--	44	2600	320	700	209

Table 30 2017 Mesic Northern Hardwood MIH ages

MNH MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	1978	520	23782	6647	29333	11906	10103	3258
Upland Deciduous	1777	443	21346	5761	27625	11608	9831	3144
Northern Hardwood	348	225	1728	952	22722	10354	2983	1740
Aspen-Birch	1429	383	19618	4809	4903	1253	6848	1404
Upland Conifer	202	77	2436	886	1707	298	272	115
Upland Spruce-Fir	78	0	1458	499	475	8	181	85
Red and White Pine	123	77	958	368	1232	290	76	26
Jack Pine	0	0	20	18	0	0	15	4
Lowland Black Spruce-Tamarack	47	34	179	24	1816	326	747	82

*Tamarack Swamp Landscape Ecosystem*

Table 31 . Tamarack Swamp Species acres and percent

Forest Type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	NFS Obj Decade 2
UPLANDS									
Jack pine	200	1	155	2	151	1	140	1	1
red pine	1300	7	1062	12	1349	7	1134	11	9
white pine	<100	0	14	0	135	1	108	1	1
spruce-fir	1900	11	619	7	1561	8	508	5	21
oak	200	1	105	1	403	2	219	2	0
Northern Hdwds	2000	11	1381	16	3112	16	2379	23	11
aspen	10800	61	4222	48	11296	58	4804	46	49
paper birch	1400	8	1219	14	1373	7	1113	11	5
TOTAL	17,800	100	8777		19380	100	10405	100	100
LOWLANDS									
tamarack	8400	27	4878	38	8969	29	5185	41	27
Black spruce	14400	47	4595	36	10854	35	3422	27	47
white cedar	4800	15	2030	16	6932	22	2665	21	15
lowland hdwds	3200	11	1240	10	4250	14	1419	11	11
TOTAL	30800	100	12744	100	31005	100	12691	100	100

Very little harvest has occurred or is planned in this LE. Shifts have occurred in age class as a result of ingrowth into the next older age class, and as a result of more recent stand data, photo re-delineation and stand typing.

Table 32 Tamarack Swamp Age class composition in acres and percentages

Age Class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	NFS NEPA Decision 2022 acres	NFS 2022 %	NFS Objective Decade 2 %
UPLANDS											
0-9	1200	7	779	9	502	3	348	3	541	3	8
10-39	6500	36	2846	32	6099	31	2874	28	4934	25	41
40-79	6400	36	2481	28	5582	29	2747	26	6114	32	25
80-119	3400	19	2267	26	5596	29	3094	30	5897	30	19
120-189	400	2	404	5	1576	8	1316	13	1848	10	6
190+	<100	0			25	0	25	0	46	0	0
TOTAL	17,800	100	8777	100	19380	100	10404	100	19380	100	100
LOWLANDS											
0-9	300	1	94	1	221	1	161	1	190	1	4
10-39	1300	4	687	5	1152	4	352	3	929	3	6
40-79	5600	18	1820	14	4498	15	1946	15	3515	11	8
80-119	17300	56	7790	61	14069	45	5810	46	13070	42	35
120-179	6100	20	2270	18	10844	35	4356	34	13024	42	46
180+	200	1	83	1	221	1	66	1	277	1	1
TOTAL	30,800	100	12744	100	31005	100	12691	100	31005	100	100

Table 33 2003 Tamarack Swamp MIH

TS MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	1700	779	--	3426	6200	2943	2000	1629
Upland Deciduous	1500	683	--	2819	4700	2253	1400	1173
Northern Hardwood	100	82	--	313	1300	935	100	156
Aspen-Birch	1400	601	--	2506	3300	1317	1300	1017
Upland Conifer	200	96	--	608	1500	690	500	456
Upland Spruce-Fir	100	62	--	125	1200	367	100	65
Red and White Pine	200	9	--	464	300	324	300	279
Jack Pine	100	25	--	19	0	0	0	111
Lowland Black Spruce-Tamarack	700	189	--	1181	15700	6803	4100	1301

Table 34 2017 Tamarack Swamp MIH

TS MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	502	348	7963	3917	6005	3157	4910	2983
Upland Deciduous	445	291	7170	3397	4493	2285	4075	2541
Northern Hardwood	68	64	234	165	2117	1377	1095	992
Aspen-Birch	377	227	6936	3232	2376	908	2980	1549
Upland Conifer	57	57	793	519	1512	872	835	442
Upland Spruce-Fir	9	9	412	192	593	151	547	156
Red and White Pine	49	449	286	243	919	721	231	230
Jack Pine	0	0	94	84	0	0	57	56
Lowland Black Spruce-Tamarack	222	138	2063	760	11108	5358	6431	2352

*White Cedar Swamp Landscape Ecosystem*

Table 35 White Cedar Swamp Species acres and percent by LE

Forest Type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	NFS Objective Decade 2
UPLANDS and LOWLANDS									
Jack pine					22	0			
red pine	0	0			12	0			0
spruce-fir	500	3			286	2			8
oak	0	0			12	0			0
No. hardwoods	200	1	15	7	574	4	17	7	2
aspen	8100	62	178	79	7893	61	178	78	52
paper birch	0	0	14	6	220	2	9	4	0
black spruce	1100	8	5	2	900	7	3	1	8
tamarack	100	1			109	1			1
lowland hdwds	2300	18	13	7	2004	16	22	10	18
white cedar	800	6			893	7			11
TOTAL	13,900	100	225	100	12925	100	229	100	100

Very little harvest has occurred or is planned in this LE. Shifts have occurred in age class as a result of time resulting in ingrowth into the next older age class, and as a result of more recent stand data, photo re-delineation, and stand typing.

Table 36 White Cedar Swamp Age class composition in acres and percentages

Age Class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2017 acres	NFS 2017 %	LLR 2017 acres	LLR 2017 %	NFS NEPA Decision 2022 acres	NFS 2022 %	NFS Objective Decade 2 %
0-9	1400	11			460	4			405	3	6
10-49	4400	34	168	75	5454	42	164	72	5224	40	49
50-79	2900	22	24	11	1502	12			1267	10	6
80-109	2500	19	20	9	2454	19	23	10	2763	21	12
110-139	1300	10	13	6	2105	16	42	18	2278	18	18
140+	600	4			881	7			987	8	9
TOTAL	13,100	100	225	100	12856	100	229	100	12924	100	100

Table 37 2003 White Cedar Swamp MIH

WCS MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	1800	0	--	168	2500	40	400	0
Upland Deciduous	1800	0	--	168	2300	40	300	0
Northern Hardwood	0	0	--	0	200	15	0	0
Aspen-Birch	1800	0	--	168	2100	24	300	0
Upland Conifer	0		--		300		0	
Upland Spruce-Fir	0		--		300		0	
Red and White Pine	0		--		0		0	
Jack Pine	0		--		0		0	
Lowland Black Spruce-Tamarack	0	0	--	0	900	5	200	0

Table 38 2017 White Cedar Swamp MIH age classes

WCS MIH	NFS Young	LLR Young	NFS Sapling	LLR Sapling	NFS Mature	LLR Mature	NFS Old	LLR Old
Upland Forest	460	0	5347	164	1472	17	1740	23
Upland Deciduous	460	0	5180	164	1369	17	1690	23
Northern Hardwood	0	0	9	0	221	17	356	0
Aspen-Birch	460	0	5171	164	1148	0	1334	23
Upland Conifer	0	0	167	0	103	0	50	0
Upland Spruce-Fir	0	0	165	0	94	0	28	0
Red and White Pine	0	0	3	0	10	0	0	0
Jack Pine	0	0	0	0	0	0	22	0
Lowland Black Spruce-Tamarack	0	0	58	0	648	3	303	0

## 6. Recreation

### Key Points:

The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning will occur.

Participation in recreational activities is the way that most of us come to our National Forests and Grasslands, making it an important portal for understanding their meaning, history, and relevance, and that of public lands as a whole.

Recreation opportunities on the Chippewa National Forest directly provide benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land through recreational activities associated with recreation facilities.

### Monitoring Question 1

To what extent do Forest recreation facilities and opportunities meet accessibility, health, safety, cost, and maintenance requirements and achieve resource and social objectives?

#### *Last Updated*

2011

#### *Monitoring Indicator(s)*

Recreation Site Analysis inventory results, partner projects, Forest projects, dispersed recreation inventories, significant recreation events.

#### *Monitoring Frequency*

Measure and report 2 years

#### *Background and Drivers*

The Forest Plan provides desired conditions and objectives pertaining to recreation resources at:

D-REC-3	D-RLT-1	D-RWA-1
D-REC-4	D-RLT-2	O-REC-4
D-REC-8	D-RLT-3	O-RWA-1

Managing for recreational opportunities results in a number of economic and social benefits to the surrounding communities, the regional area and nationally. Research has demonstrated that visitors to the Chippewa National Forest participate in a number of different activities, including fishing, viewing natural features, hiking, relaxing, hunting, motorized water activities, viewing wildlife, pleasure driving and camping (NVUM Survey 2016).

Public visitation of the Chippewa National Forest has decreased over the past decade and the budget associated with recreation management has decreased significantly on the Chippewa



National Forest. The Forest Service is responsible for identifying an appropriate mix of recreational opportunities for National Forest System lands and the settings needed to provide quality recreational opportunities.

The indicator demonstrates the importance recreation facilities and opportunities.

### ***Monitoring Indicator #1***

#### **Accessibility:**

Accessibility expectations require any newly construction to be accessible. The following projects which were identified through Recreation Facility Analysis (2008) and/or Condition Use Surveys enhanced accessibility for visitors and were tracked in the Infrastructure Forest Service database (INFRA):

- Stony Point Shower building rehabilitation project (2017). Accessibility improvements included leveling thresholds into showers for wheelchair access, installations of handrails, seats and shower head/faucets.
- Norway Beach vault toilet replacements (2017). Accessibility improvements include wider doors and hand rails.
- Suomi Hills vault toilet replacement (2016). Accessibility improvements include wider doors and hand rails.
- Installation of accessible fire rings (24) and picnic tables (30). (2016-2017)



**Figure 6 Accessible remodeled shower building at Norway Beach Recreation Area**



**Figure 7 One of four new accessible vault toilets at Stony Point Campground**

## ***Monitoring Indicator #2***

### **Deferred Maintenance:**

Several deferred maintenance projects identified through Recreation Facility Analysis (2008) and Condition Use Surveys have been implemented in 2016-2017 to reduce or improve site service and facilities. The following projects were finalized and were tracked in the Infrastructure Forest Service database (INFRA):

- Reduce site visits to mow, pick up trash, and clean toilets at multiple recreation facility sites (2016-2017).
- Replaced 5 vault toilets (2016-2017).
- Replaced multiple fire rings and picnic tables (2016-2017).
- Remodeled the Stony Point Shower building (2017).
- Stewardship agreement with the MN Department of Natural Resources to share in the maintenance of many of the water access locations was finalized in an agreement (2016).
- Entered into a Special Use Permit with Edge of the Wilderness Discovery Center to administer the entire Marcell Ranger Station site (2016).
- Renewed an agreement with Edge of Wilderness Discovery Center to provide Visitor Information Services and naturalist programs at the Marcell Discovery Center (2017).
- Formalized an agreement with the Northern Lights Ski Club in grooming Trout Lake Trails (2016)
- Renewed agreements with Cass County and Itasca County for management of snowmobile trails (2017).
- Reduce the size and scope of garbage collection contract.
- Formalized an agreement with Cass County Sentence to Serve to mow and clean several Recreation sites (2017).
- Replaced the bridge decking on Mi-Gi-Zi Trail Bridge (2017).



Figure 8 Discovery Center VIC Special Use Permit Figure 9 New dock at North Star Boat Access

### ***Discussion Summary of Monitoring Indicators #1 and #2***

There are less recreational facility opportunities available now than in 2004. The reduction in recreation facilities has been budget-driven to primarily reduce annual and deferred maintenance costs. The forest recreation facility costs have decreased, and budgets will most likely continue to decrease. Subsequently, additional recreation facility changes will be analyzed over the continued life of the forest plan. These changes will include, but not limited to: campground fee increases, facility closures, and additional reduced services.

Participation in recreational activities is the way that most of the American public experience National Forests and Grasslands. It is an important portal for understanding the meaning, history, and relevance of our Nation's public lands.

Recreationists, Outfitters and Guides benefit directly from the National Forest System lands which local businesses benefit from spending by Forest visitors. Total spending by visitors to the Chippewa National Forest for is approximately \$38.2 million annual (Benefits to People, At a Glance Report).

Recreation opportunities on the Chippewa National Forest directly provide benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land through recreational activities associated with recreation facilities. These opportunities play an important role in how communities come to gather for physical and mental health, family and to connect with the land.

Recreation facilities include the built landscape. This includes the campgrounds - the fire rings, toilets, water pumps, parking; swimming beaches, and camping spurs. At remote campsites it includes amenities such as fire rings. There are also the trails and trailheads; boat landings, and picnic areas.

In 2017, the Forest initiated the Recreation Site Analysis (RSA) for all recreation sites on the Forest. The RSA is expected to be finalized in 2019.

The purpose of Recreation Site Analysis (RSA) is to create a 5-year Recreation Facility Strategy (RFS) for recreation sites to contribute to sustainability on the Chippewa NF. It is an evolution of Recreation Facility Analysis (RFA) which was completed on the Chippewa in 2008. While the goals of RFA such as operating and maintaining sites to standard and reducing deferred

maintain costs are still valid, Recreation Facility Strategy broadens these goals to consider how recreation sites contribute to social stability, environmental integrity, and economic vitality for the forest and its communities.

This 5-year Recreation Facility Strategy serves as a framework from which the Chippewa will prioritize investments, as well as pursue changes in operations or maintenance of developed recreation sites and facilities. Proposals are consistent with the Framework for Sustainable Recreation and the 2004 Chippewa Land and Resource Management Plan.

In addition in 2017, the Forest began inventorying all dispersed recreation sites with the intention to reduce managed dispersed sites from over 350 to less than 100. The project is expected to be completed in 2018. The Forest will be providing electronic site data to visitors seeking these sites.

### *Recommendations*

The Forest has increased partnerships and are looking for new opportunities to enhance or improve recreation management. The Chippewa National Forest must continue to evaluate the facilities and determine the cost effectiveness of keeping them open or improving them in the future.

### *Evaluation of Monitoring Question and Indicator(s)*

Future monitoring questions should be designed to refer to the changes that have been implemented based on the Recreation Site Analysis which will be finalized in 2019 and the Dispersed Recreation Site Project which will be finalized in 2018.

## **Monitoring Question 2**

What is the status and trend of visitor use, visitor satisfaction, and progress toward meeting recreation objectives in the plan?

### *Last Updated*

2004

### *Monitoring Indicator(s)*

Recreation Site Analysis inventory results and National Visitor Monitoring.

### *Monitoring Frequency*

Measure and report every 5 years (cycle for NVUM surveys)

### *Background and Drivers*

The Forest Plan provides desired conditions and objectives regarding recreation resources at:

D-REC-8

D-RLT-1

O-REC-4

Managing for recreational opportunities results in a number of economic and social benefits to the surrounding communities, the regional area and nationally. Research has demonstrated that visitors to the Chippewa National Forest participate in a number of different activities, including fishing, viewing natural features, hiking, relaxing, hunting, motorized water activities, viewing wildlife, pleasure driving and camping (NVUM Survey 2016).



**Figure 10 Visitor fishing**



**Figure 11 Rabideau Picnic Shelter**

The National Visitor Use Monitoring (NVUM) program provides statistically reliable information about recreation visitors to national forest system managed lands at the national, regional, and forest level. NVUM information assists Congress, Forest Service leaders, and program managers in making sound decisions that best serve the public and protect valuable natural resources by providing science

based, reliable information about the type, quantity, quality and location of recreation

use on public lands. The information collected is also important to external customers including state agencies and private industry. The survey is voluntary – participation is wholly dependent on the individual willing to stop at the survey location and spend up to 15 minutes answering questions.

The indicator demonstrates the trends in visitor uses on the Forest in 2006, 2011 and 2016.

### ***Monitoring Indicator #1***

National Visitor Use Monitoring (NVUM) data reports.

The NVUM program has two concurrent goals. First, to produce estimates of the volume of recreation visitation to National Forests and Grasslands. Second, to produce descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit.

**Table 39 Total Estimated Annual Visitation Estimate**

<b>Year</b>	<b>Visitation</b>
<b>2006</b>	<b>1,042,000</b>
<b>2011</b>	<b>610,000</b>

<b>2016</b>	<b>509,000</b>
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**Table 40 Top 10 Activity Participation for each NVUM survey year**

<b>2006</b>	<b>2011</b>	<b>2016</b>
Viewing Natural Features	Viewing Natural Features	Fishing
Viewing Wildlife	Hunting	Viewing Natural Features
Hunting	Viewing Natural Features	Hiking/Walking
Hiking/Walking	Relaxing	Relaxing
Relaxing	Fishing	Hunting
Driving for Pleasure	Viewing Wildlife	Motorized Water Activities
Snowmobiling	Driving for Pleasure	Viewing Wildlife
Fishing	Picnicking	Driving for Pleasure
Nature Study	Picnicking	Developed Camping
Motorized Trail Activity	Motorized Trail Activity	Snowmobiling
Picnicking	Developed Camping	Resort Use

**Table 41 Visitor gender demographics**

<b>Year</b>	<b>Responses from Females</b>	<b>Responses from Males</b>
2006	11.9%	88.1%
2011	26.3%	73.7%
2016	32.5%	67.5%

**Table 42 Visitor race/ethnicity**

<b>Year</b>	<b>American Indian/Alaska Native</b>	<b>White</b>	<b>Other</b>
2006	6.4%	91.8%	1.8%
2011	3%	92.9%	4.1%
2016	4.2%	94.8%	1%

**Table 43 Visitor age**

<b>Year</b>	<b>Under 16</b>	<b>16-29</b>	<b>30-59</b>	<b>60-older</b>
2006	15.5%	13.4%	54.9%	16.3%
2011	20.3%	10.4%	45.3%	24.0%
2016	21.8%	10.2%	50.3%	17.7%

**Table 44 Visitors home location**

<b>Year</b>	<b>Itasca</b>	<b>Beltrami</b>	<b>Cass</b>	<b>Other</b>
2006	57.0%	15.6%	16.2%	11.2%
2011	46.2%	19.7%	10.9%	23.2%
2016	32%	25.2%	16%	26.8%

**Table 45 Recreation related economic factors**

<b>Economics</b>	<b>2006</b>	<b>2011</b>	<b>2016</b>
Average Total Trip Spending	\$300	\$276	\$293
% Lodged at FS Developed Campground	11.5%	22.6%	17.6%
% Lodged at Non-Developed Camping	12.7%	7.1%	8.4%
% Lodged in NFS cabin	25.6%	27.9%	28.3%
Income under \$50,000/year	46.8%	38.9%	29.8%
Income over \$50,000/year	53.2%	61.1%	70.2%

**Table 46 Overall visitor satisfaction**

<b>Visitor Overall</b>	<b>2006</b>	<b>2011</b>	<b>2016</b>
Very Satisfied	67.2%	61.7%	76.1%
Very Dissatisfied	2.2%	3.9%	2.8%

**Table 47 Visitor Satisfaction related to Developed Sites**

<b>Item</b>	<b>2006</b>	<b>2011</b>	<b>2016</b>
Developed Facilities Overall	85.6%	87.7%	94.6%
Access	91.3%	92.1%	92.9%
Services	85.1%	90.9%	94.4%
Feeling of Safety	100.0%	100.0%	95.9%



### *Discussion Summary of Monitoring #1*

Over the past ten years our surveys show a significant decrease in use. This could, in part, be attributed to the recession which began in 2008 as well as the decrease in outdoor users. Additionally, the Forest believes the formula used to determine visitation in 2006 was likely flawed and believe the numbers represented in years 2011 and 2016 are reflective of the actual average visitation.

In each survey year, participation for Viewing Natural Features, Viewing Wildlife, Hunting, Relaxing, Driving for Pleasure and Fishing were identified as the majority of the activities. After identifying their main recreational activity, visitors were asked how many hours they spent participating in that main activity during this national forest visit. Some caution is needed when using this information. Because most national forest visitors participate in several recreation activities during each visit, it is more than likely that other visitors also participated in this activity, but did not identify it as their main activity.

Descriptions of forest recreational visits were developed based upon the characteristics of interviewed visitors (respondents) and expanded to the national forest visitor population. Basic demographic information helps forest managers identify the profile of the visitors they serve.



**Figure 12 Kayak on Nose Lake**

Management concerns such as providing recreation opportunities for underserved populations may be monitored with this information. The tables above provide basic demographic information about visitors interviewed regarding Gender, Race/Ethnicity, Age and home location respectively.

The majority of those surveyed were males. Among racial and ethnic minorities, the most commonly encountered are Native Americans in each of the years. The age distribution shows most of the visitors are over 30 years old. Approximately 75% of the visitors come from those living in the local area. Visitors from outside the three county location have steadily increased over the three separate survey years.

Local communities look increasingly to tourism to support their communities. When considering recreation-related visitor spending managers are often interested both in identifying the average spending of individual visitors (or types of visitors) and the total spending associated with all recreation use.

Spending averages for visitors or visitor parties can be estimated using data collected from a statistically valid visitor sampling program such as NVUM. To estimate the total spending associated with recreation use, three pieces of information are needed: an overall visitation





**Figure 13** Around the campfire at Norway Beach Campground

estimate, the proportion of visits in the visitor types, and the average spending profiles for each of the visitor types. Multiplying the three gives a total amount of spending by a particular type of visitor.

For the majority of visitors, developed and non-developed campgrounds were not the primarily lodging destination for their trip. Over 25% of the surveyors, however, indicated they were lodging in one of the 286 recreation residence cabins under special use permit. The income distribution results show increasing trend in income over the past ten years.

An important element of outdoor recreation program delivery is evaluating customer satisfaction with the recreation setting, facilities, and services provided. Satisfaction information helps the Forest decide where to invest in resources and to allocate resources more efficiently toward improving customer satisfaction. The overall satisfaction results for the Forest have been favorable. Over

three-fourths of all visits were very satisfied with their overall recreation experience. The results for the composite indices were also very good. The satisfaction at developed sites increased over the past ten years, while the safety component decreased. Similar numbers occurred for non-developed sites as well.

Performance ratings for all years varied. Some years visitors indicated a need for more employee helpfulness and interpretive signing while other years the Forest provided too much. Overall the visitors indicated the Forest has done a good job for each category of sites (day use, overnight developed and overnight non-developed sites).

### ***Recommendations***

The Forest should continue to monitor the NVUM results and compare them to the previous surveys. Both developed and non-developed site use need to be evaluated to determine whether the Forest should reduce or improve facilities.

In 2017, the Forest began analyzing and inventorying sites on the Forest through the recreation site analysis project (RSA). The results of the RSA are expected to be finalized in 2019. In addition, beginning in 2016, the Forest began reviewing all dispersed camping sites on the Forest to reduce the number of managed sites from over 350 to less than 100. These types of projects will enable the Forest to determine how to prioritize projects on the Forest and improve sustainability.

### ***Evaluation of Monitoring Question and Indicator(s)***

Future monitoring questions should be designed to refer to the changes that have been implemented based on results from the NVUM surveys.

### ***References***

2006 National Visitor Use Monitoring Report – Chippewa National Forest

2011 National Visitor Use Monitoring Report – Chippewa National Forest

2016 National Visitor Use Monitoring Report – Chippewa National Forest

2008 Recreation Facility Analysis – Chippewa National Forest

2016 National Visitor Use Monitoring Report – Chippewa National Forest

2016-17 Condition Use Surveys – Chippewa National Forest

2019 Draft Recreation Site Analysis – Chippewa National Forest

## 7. Social and Economic Stability

In response to the monitoring questions below, several different monitoring indicators are presented and discussed related to timber management on the Chippewa National Forest. These indicators include timber target, volumes, acres, harvest by treatment method, revenues, ratio of sawtimber to pulpwood, revenues and payments to counties. Data from several fiscal years are included to provide an analysis of trends. This data was compiled from actual timber sales sold and harvested in FY2011-FY2017.

### Key Points

Output levels of timber harvest have remained approximately stable, while treatment methods are deviating from those anticipated for Decade 2.

The annual target for timber volume sold is negotiated between the Forest and the Region. The annual sell target has been relatively flat averaging 45.8 MMBF from FY2011–FY2017. Volume sold has been slightly above the assigned target from FY2011–FY2017. Acres sold have fluctuated from 4,980 acres in FY2011 to 6,434 acres in FY2013.

The ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the first three years of Decade 2.

### Monitoring Questions

1. How close are projected outputs and services to actual?
2. To what extent does output levels of timber harvest and mix of saw timber and pulpwood compare to those levels projected?

### *Last Updated*

FY2015 Monitoring and Evaluation Report

### *Monitoring Indicator(s)*

Timber: Table APP-D2: Acres of timber harvest by treatment method comparing estimated to actual volume sold and harvested annually; acres sold and harvested annually.

### *Monitoring Frequency*

Every two years

### *Background and Drivers*

36 CFR 219.12(k) A quantitative estimate of performance comparing outputs and services with those projected by the forest plan.

The Forest Plan provides desired conditions, objectives, standards and guidelines pertaining to commercial timber harvest at:

D-TM-1

O-TM-1

Table APP-D2, corrected 09/04/2007

## Monitoring Indicator 1

### Results

#### Harvest by Treatment Method

The Forest uses a variety of silvicultural treatments to accomplish Forest Plan objectives. For Decade 1 (2004-2014), thinning treatments exceeded the planned acres while clearcutting treatments were below planned acres (Table 2-1). Overall, total acres treated for Decade 1 (39,500 acres) were 51 percent of planned treatment acres (77,139 acres).

**Table 48. Decade 1 (2004-2014) Proposed and actual acres of timber harvest by treatment method<sup>1</sup>**

Treatment	Proposed Decade 1 Treatment Acres	Decade 1 Actual Treated Acres	Proposed Decade 1 % acres treated	Actual Decade 1 Treated % acres
Thinning	16,000	18,130	21	46
Clearcut	29,866	12,777	39	32
Shelterwood	11,149	4,750	14	12
Uneven-aged	20,124	3,843	26	10
<b>Totals</b>	<b>77,139</b>	<b>39,500</b>	<b>100%</b>	<b>100%</b>

For Decade 2 (2015-2025), the total probable acres treated increased to 82,222 (Table 2-2) compared to 77,139 for Decade 1. For FY 2015-2017, total acres treated was 15,855, which is 64 percent of planned treatment acres on a per year basis ( $82,222/10 = 8,222$  acres per year).

**Table 49. Decade 2 (2015-2025) Probable and actual acres of timber harvest by treatment method<sup>2</sup>**

Treatment	Probable Decade 2 Treatment Acres	Decade 2 Actual Treated Acres (FY15-17 data only)	Probable Decade 2 % acres treated	Actual Decade 2 Treated % acres (FY15-17 data only)
Thinning	11,578	6,186	14	39%
Clearcut	30,881	4,932	38	31%
Shelterwood	11,101	2,045	14	13%
Uneven-aged	28,662	2,692	35	17%
<b>Totals</b>	<b>82,222</b>	<b>15,855</b>	<b>100%</b>	<b>100%</b>

#### Allowable Sale Quantity (ASQ)

The ASQ is the maximum amount of volume that may be offered and sold during a given decade of Forest Plan implementation from land identified as suitable for timber management (2004 USDA). For decade 1, ASQ is 580 million board feet or 58 million board feet per year (MMBF). For decade 2, ASQ increases to 600 MMBF or 60 MMBF per year. In the first three years of

<sup>1</sup> From Forest Plan Table APP-D2 Administrative Correction 9/14/2007.

USDA Forest Service. 2004. Land and Resource Management Plan. Chippewa National Forest. Eastern Region, Milwaukee, Wisconsin.

<sup>2</sup> from Forest Plan Table APP-D2 Administrative Correction 9/14/2007

decade 2 (FY2015-FY2017), the average volume sold is 47.5 MMBF or 79 percent of ASQ. For decade 1 (FY2004-FY2014), the average volume sold is 40.3 MMBF or 69 percent of ASQ (USDA 2017).

### Discussion

For decade 1, thinning treatments totaled 18,130 acres while planned acres for thinning were 16,000 acres. Acres treated with clearcut treatments totaled 12,777 acres while planned acres for clearcut in decade 1 were 29,866 acres. The data from decade 1 indicate that thinning treatments are over prescribed and even-aged treatments such as clearcut and shelterwood are under prescribed. These management choices have direct impacts on the ability of the Forest to meet age class objectives in the Forest Plan.

It is important to note that the administrative correction issued 09/14/2007 by Forest Supervisor Robert Harper amending the proposed and probable practices table APP-D2 in the Forest Plan applies only to decade 1. The treatment method percentages and acres for decade 2 remain unchanged. This is important because the acres and percentage of thinning treatments was increased in decade 1 under the administrative correction.

For the first three years of decade 2 (FY2015-FY2017), thinning treatments totaled 6,186 acres while the planned total for decade 2 for thinning is 11,578 acres. The results indicate a significant accomplishment of thinning early in the decade (over 53 percent of the entire decade total).

For the first three years of decade 2 (FY2015-FY2017), even age treatments including clearcut and shelterwood treatments totaled 6,977 acres while the planned total for decade 2 for even aged treatments is 41,982 acres. The results indicate a potential underperformance in accomplishment of even aged treatments early in the decade (16.6 percent of the entire decade total) and potential for not meeting age class objectives in the Forest Plan.

### *Recommendations*

Given that thinning treatments exceeded planned treatments for decade 1 and are on a trajectory to exceed planned levels for decade 2, consideration should be given to reducing prescribed thinning treatments in future decisions when viable alternatives exist for other treatment types. In addition, even aged management treatments were significantly less than planned treatments for decade 1 and are currently on a track to significantly underperform planned levels for decade 2. Even aged treatments including clearcut, seed tree and shelterwood harvests should be considered in future decisions where silviculturally appropriate. Considering more even aged treatments will help the Forest meet age class objectives in the Forest Plan and better balance age classes across the Forest.

### *Evaluation of Monitoring Question and Indicator*

No changes needed.

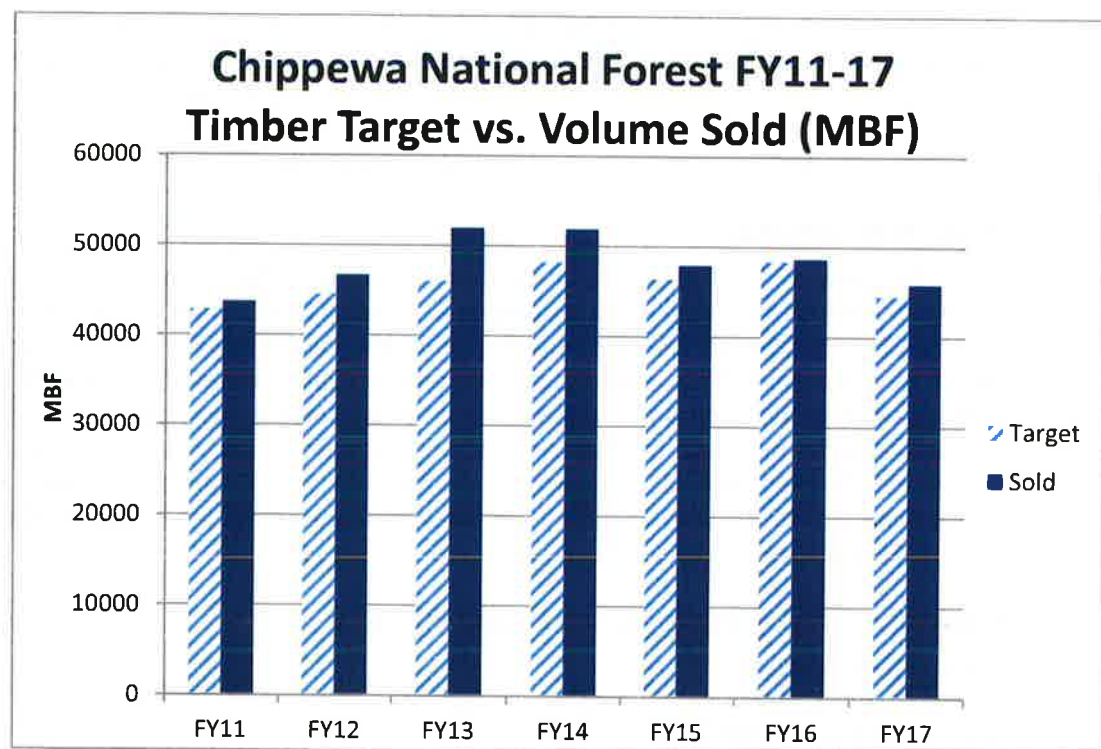
### *Monitoring Indicator 2*

Timber target (MBF); volume sold (MBF), volume harvested (MBF), uncut volume under contract (MMBF), acres sold, acres harvested, ratios of sawtimber to pulpwood volume sold compared to Forest Plan estimated ratios.

## Results

**Table 50 Timber Target, Volume Offered and Sold, Volume Harvested, and Uncut Volume under Contract, and acres sold and harvested from FY2011-FY2017**

Indicator	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY2016	FY2017
Timber Target (MBF)	42,810	44,500	46,000	48,200	46,350	48,350	44,500
Volume Sold (MBF)	43,706	46,695	51,982	51,884	47,927	48,670	45,871
Volume Harvested (MBF)	34,803	33,756	49,132	48,204	53,920	45,988	45,192
Uncut volume under contract (MMBF)	109.8	122.5	125.4	130.6	125.1	125.8	126.0
Acres Sold	4,980	5,950	6,434	5,847	5,581	6,370	5,693
Acres Harvested	3,943	4,967	5,782	5,717	5,698	5,561	4,595

**Figure 14 Chippewa National Forest FY11-17 Timber Target vs. Volume Sold (MBF)**

## Discussion

The annual target for timber volume sold is negotiated between the Forest and the Region. The annual sell target has been relatively flat averaging 45.8 MMBF from FY2011–FY2017. Volume

sold has been slightly above the assigned target from FY2011–FY2017. Acres sold have fluctuated from 4,980 acres in FY2011 to 6,434 acres in FY2013.

Volume harvested peaked in FY2015 at 53,920 MBF and has leveled off in recent years at approximately 45,000 MBF. Improved economic conditions as well as investments by regional mills in upgrades to equipment and capacity have kept demand for stumpage steady.

Uncut volume under contract has increased slightly, from 125.1 MMBF in FY2015 to 126.0 MMBF in FY 2017. This is equivalent to approximately 2 1/2 years of annual sell target volume under contract. Given that the contract duration of most timber sales is three to five years on the Forest, this amount of uncut volume under contract is normal.

The number of acres harvested have declined recently from 5,698 acres in FY 2015 to 4,595 acres in FY 2017 (table 50). Some recent decline in stumpage prices can explain some of the reduction in acres harvested as loggers will defer harvest until market conditions and prices improve.

Recent reports in Minnesota cite a declining demand for traditional forest products due to decreasing demand for paper products, changes in international markets and the 2008 collapse of the housing market (MFRC 2018). The remaining mills in Minnesota have made improvements and upgrades as recent as 2013 to improve their positions in a competitive global marketplace (Deckard 2013). Examples of improvements include Norbord, Sappi and Potlatch. Norbord installed new rotary drums in 2011 increasing their size and added a second weight scale at a cost of \$350,000. Sappi completed a \$170 million capital conversion project in 2013 at the Cloquet mill and now makes specialized cellulose used in textile and consumer goods markets. Potlatch added a fourth dry kiln that added capacity to dry a more diverse range of species including balsam fir.

### *Recommendations*

Forest products offered on the Chippewa National Forest are important regionally as well as globally. In addition to providing important economic value to the region and state, forest management on the Chippewa National Forest meets a number of Forest Plan objectives for wildlife habitat, riparian restoration, fuels treatment, age class objectives and forest health. Timber target levels should be carefully considered and planned to sustain and maintain a consistent and reliable supply of forest products from the Forest.

## Results

**Table 51 Value of stumpage offered and sold by the Chippewa National Forest from FY2011-FY2017**

Fiscal Year	Total Value (\$)	Value \$/mbf	Value \$/ccf	Aspen pulpwood \$/mbf	Sawtimber (80%+pine) \$/mbf
FY 2011	3,073,538	70.32	43.24	66.97	111.79
FY 2012	3,204,198	68.62	42.02	73.81	115.90
FY 2013	2,386,483	45.91	28.34	43.98	132.14
FY 2014	3,662,593	70.59	43.10	58.47	159.52
FY 2015	4,169,868	87.00	52.96	84.44	160.66
FY2016	3,989,541	81.97	49.87	93.16	129.80
FY2017	3,284,235	71.60	43.90	89.42	111.33

## Discussion

Overall revenue for timber offered and sold decreased from FY 2015 to FY 2017 (table 51). The 10 year average value of timber sold on the Chippewa National Forest is \$2,999,793 (FY2008 - FY2017). Overall stumpage values in \$/MBF and \$/CCF have declined in the past three fiscal years (FY2015- FY2017).

Sawtimber prices have declined 31 percent from \$160.66/MBF in FY2015 to \$111.33/MBF in FY2017. The major species of sawtimber on the Chippewa is red pine. Aspen prices have declined a less amount from \$93.16/MBF in FY2016 to \$89.42/MBF in FY2017.

Competition in bidding by purchasers for federal timber has remained steady. In FY 2017, there were 18 different bidders with an average of 2.6 bidders per sale (USDA 2017). Bidders for stewardship timber sales have declined with some sales only receiving one or two bidders in FY2018. The Forest attracts some of the largest purchasers operating in the state of Minnesota due to large volume sales and all season operating conditions throughout the year.

## Recommendations

Past trends indicate a consistent and steady interest by Purchasers in bidding on timber sales from the Chippewa National Forest. The exception is a declining level of interest in bidding on stewardship timber sales. Careful planning and consideration should be given to stewardship sale offerings to include service work that is attractive to Purchasers and also consideration given to utilizing retained receipts to fund service work that is not desirable by timber Purchasers such as bud capping, tree release work and tree planting. In addition, the Forest needs to consider what the optimum mix of stewardship and regular timber sale offerings should be in an effort to retain interest and competition by Purchasers and to avoid no-bid situations in the future.



## Results

**Table 52 Ratio of sawtimber to pulpwood volume sold<sup>3</sup> from Chippewa National Forest Land and Resource EIS table TMB-20 for modified alternative E.**

Indicator	Decade 1 (Proposed)	Actual Ratio FY 2011	Actual Ratio FY 2012	Actual Ratio FY 2013	Actual Ratio FY 2014
Sawtimber: Pulpwood	32:68	18:82	19:81	14:86	23:77
	Decade 2 (Probable)	Actual Ratio FY 2015	Actual Ratio FY 2016	Actual Ratio FY 2017	
Sawtimber: Pulpwood	43:57	26:74	23:77	21:79	

## Discussion

As illustrated in table 52, the ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the first three years of Decade 2. One of the reasons for this is the increased amount of thinning in pine stands and the removal of small diameter material. With the 2007 administrative correction, proposed thinning acres increased from 6,749 acres to 16,000 acres in Decade 1. In FY 2017, the ratio of sawtimber to pulpwood decreased to 21:79 compared to a ratio in FY2016 of 23:77 (table 52). Another reason for the lower percentage of sawtimber to pulpwood is the reduced even-aged harvest treatments in both decade 1 and decade 2 to date that would have increased the ratio of sawtimber to pulpwood due to the final harvest of mature and over mature trees.

## Recommendations

The ratio of sawtimber to pulpwood is not meeting Forest Plan expectations for Decade 1 or Decade 2 currently. The acres of treatments using thinning are exceeding Forest Plan estimates for Decade 1 and show an expected similar result in decade 2, given the current actual acres in the first three years of Decade 2. The Forest should consider prescribing more even-aged final harvest treatments to better balance the sawtimber:pulpwood ratio as well as meet age class objectives across the Forest. Forest Plan standard S-TM-5 allows even-aged regeneration harvest (clearcutting, seed tree, shelterwood) after a stand has reached at least 95 percent of culmination of mean annual increment (USDA 2004). For red pine and white pine, the minimum age for even-aged regeneration harvest is 60 years. Final harvest in aspen will not improve the sawtimber/pulpwood ratio as all aspen is sold as pulpwood and utilized by mills as pulpwood.

## Results

**Table 53 Payments to Counties for FY 2015 (USDI 2018).**

FY2015	FY2015	Payment in Lieu of Taxes (PILT)	SRS Title I Funds	SRS Title II Funds	Grand Total
County	FS Acres	Total \$	Total \$	Total \$	Total \$
Beltrami	62,339	114,726	81,223	14,333	95,556
Cass	287,147	594,287	252,941	44,637	297,578
Itasca	306,276	575,123	364,943	34,348	399,291
Total	655,762	1,284,136	699,107	93,318	792,425

<sup>3</sup>From Chippewa National Forest Land and Resource EIS table TMB-20 for modified alternative E. USDA Forest Service. 2004. Final Environmental Impact Statement for Forest Plan Revision, From the Chippewa National Forest and Superior National Forest. Eastern Region, Milwaukee, Wisconsin.

**Table 54 . Payments to Counties for 2016 (USDA 2018).**

<b>FY2016</b>	<b>FY2016</b>	<b>Payment in Lieu of Taxes (PILT)</b>	<b>SRS Title I Funds</b>	<b>SRS Title II Funds</b>	<b>Grand Total</b>
County	FS Acres	Total \$	Total \$	Total \$	Total \$
Beltrami	62,339	118,465	N/A	N/A	
Cass	287,147	614,990	N/A	N/A	
Itasca	306,276	572,701	N/A	N/A	
Total	655,762	1,306,156			

### Discussion

The federal government makes payments to states to cover some of the cost of local government services on tax-exempt National Forest System lands. The states pass those payments on to the counties in which National Forests are located. Payments in Lieu of Taxes (PILT) payments are calculated and made by the Department of Interior, Bureau of Land Management. These payments are appropriated annually by Congress based on available funding and formulas that take into account the population in the affected counties, the number of acres of federal land in those counties, and other payments received by the counties based on federal land payments.

The Secure Rural Schools and Community Self- Determination Act (SRS) was enacted in 2000 and since then has been reauthorized several times. In a recent reauthorization, the FS requested states and counties to elect either to receive a share of the 25% rolling average payment or to receive a share of the Secure Rural Schools State (formula) payment. A county electing to receive a share of the State payment that is greater than \$100,000 annually was required to allocate 15-20 percent of its share for one or more of the following purposes: projects under Title II of the Act, Projects under Title III; or return the funds to the Treasury of the United States. Under the Secure Rural Schools Act additional money was made available to be used for projects recommended by local resource advisory committees (RAC) to maintain infrastructure, improve the health of watersheds and ecosystems, protect communities, and strengthen local economies. Payments to Counties for FY 2015 and FY2016 are displayed above in table 53 and table 54.

### *Evaluation of Monitoring Question and Indicator(s)*

The monitoring questions and associated indicators for the Timber Program required in the Final Monitoring Guide for the Chippewa National Forest are adequate and useful for determining trends and consistency with Forest Plan objectives.

### *References*

- Deckard, Don. 2013. Investments at several mills over past year. MN Department of Natural Resources Division of Forestry Market Update.
- Minnesota Forest Resources Council. 2018. 2nd Generation North Central Landscape Plan. Section 4-Resource Assessment and Trends.
- USDA, Forest Service. 2016. FY2016 Bid monitoring report. November 7, 2016. Chippewa National Forest.

USDA, Forest Service. 2017. FY2017 Bid monitoring report. November 6, 2017. Chippewa National Forest.

USDA, Forest Service. 2017. Chippewa National Forest Timber Statistics. September 30, 2017. Chippewa National Forest.

USDA, Forest Service. 2018. Secure Rural Schools website.  
<https://www.fs.usda.gov/main/pts/securepayments/projectedpayments>

USDA, Forest Service. 2018. Annual reforestation and timber stand improvement report. FACTS report 206F.

USDA, Forest Service. 2004. Land and Resource Management Plan. Chippewa National Forest. Eastern Region. Milwaukee, WI.

US Department of Interior. 2018. Payment in Lieu of Taxes website.  
[https://www.nbc.gov/pilt/counties.cfm?term=county&state\\_code=MN&fiscal\\_yr=2015](https://www.nbc.gov/pilt/counties.cfm?term=county&state_code=MN&fiscal_yr=2015)

## 8. Soils

The physical, chemical, and biological properties of soils determine how their natural biologic, hydrologic, and other ecologic functions. Assessment these soil properties contributes to better understanding of how soil productivity is affected by management activities.

### Key Points

Overall, past soil disturbance monitoring over the period of record indicates that harvest activities alone have resulted in little soil disturbance and Forest Plan desired conditions and objectives are generally being met.

Although the general level of soil disturbance is low over the period of the monitoring record for post-harvest evaluations, some of the pre-harvest evaluations had some soil disturbance. Further evaluation of this monitoring question and indicator is necessary to ensure forest management activities are not affecting long-term soil productivity and viability of natural ecosystems.

### Monitoring Question

Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?

#### *Last Updated*

In 2015, the Chippewa National Forest Monitoring and Inventory Survey Team evaluated soil disturbance after treatments in eleven stands and before treatments in five stands. The evaluations followed the Forest Soil Disturbance Monitoring Protocol (Page-Dumroese et al. 2009a), which is designed to quickly assess changes to soil properties and assign soil disturbance classes based on forest floor and soil surface and subsurface conditions. Standards and guidelines from the Chippewa National Forest Land and Resource Management Plan (or Forest Plan) were generally being met, but there was some indication that soils may not be recovering between entries. The conclusion was that additional monitoring and more detailed analysis of results would be necessary to fully validate the initial findings (USDA-FS 2015).

#### *Monitoring Indicator*

Summary of soil disturbance classes using the Forest Soil Disturbance Monitoring Protocol.

#### *Monitoring Frequency*

Since 2014, soil disturbance monitoring has occurred annually and will continue to into the foreseeable future. Due to the small sample size of stands evaluated during any given year, the results of all soil disturbance monitoring since 2014 are discussed in this section.

#### *Background and Drivers*

Per the 2012 National Forest System Land Management Planning Rule (or Planning Rule), the monitoring element addressed in this section is 36 CFR 219.12(a)(5)(viii), "The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land. (16 U.S.C.1604(g)(3)(C))."

The Forest Plan provides desired conditions and objectives pertaining to maintenance/restoration of soil physical, chemical, and biological properties, whereby

maintaining/enhancing soil biologic, hydrologic, and other ecosystem functions (USDA-FS 2004, Ch.2, pp.11-13) at:

D-WS-3

O-WS-9

D-WS-12

O-WS-10

The Forest Soil Disturbance Monitoring Protocol provides a means of estimating soil disturbance by calculating the number of points evaluated per sample unit, or in the case of this report, stands. At a minimum, a stand has 30 sample points, but the number of points needed to be statistically significant are based on the variability of the data collected and the confidence interval and interval width established prior to sampling. Each point is assigned a disturbance class based on the greatest degree of disturbance in any parameter, ranging from Class 0 (or no evidence of disturbance) to Class 3 (or severe disturbance) (Page-Dumroese et al. 2009b). Areas classified as Class 3 are the most disturbed but may or may not be detrimentally disturbed for some ecological systems, as evidenced in some past monitoring on the Hiawatha National Forest (Gries and Efta 2012). The Forest Service Manual defines detrimental soils in terms of permanent soil impairment, or "... changes in soil properties (physical, chemical, and biological) that result in the loss of the inherent ecological capacity or hydrologic function of the soil resource that lasts beyond a land management planning period." (USDA-FS 2010) Soil sensitivity, natural disturbance adaptation of the site, and mitigation and best management practice effectiveness are all factors that must be considered by a specialist when determining the degree to which soils may be detrimentally impacted.

### Pre-Harvest Monitoring Results

Since 2015, soil disturbance has been evaluated in twelve stands prior to treatment. This pre-treatment data establishes baseline conditions for which to later compare post-harvest conditions and evaluate the intensity and scope of management effects to soils. Average soil disturbance observed in 2015 and 2016 is shown in table 55.

**Table 55 2015-2016 Average Soil Disturbance in Stands Prior to Treatment**

Proportion Class 0	Proportion Class 1	Proportion Class 2	Proportion Class 3	Proportion Detrimental
0.98	0	0.02	0	0

Soil disturbance was only observed in three of the twelve stands. As compared to prior Forest Plan monitoring evaluations (USDA-FS 2014, 2015), pre-treatment soil disturbance remains low but not completely absent from every stand. There are several factors that influence soil disturbance (e.g. past forest management activities, wildfires, and windthrow), but additional monitoring is needed to determine baseline conditions at varying landscape scales and if soils have sufficiently recovered from past forest management activities.

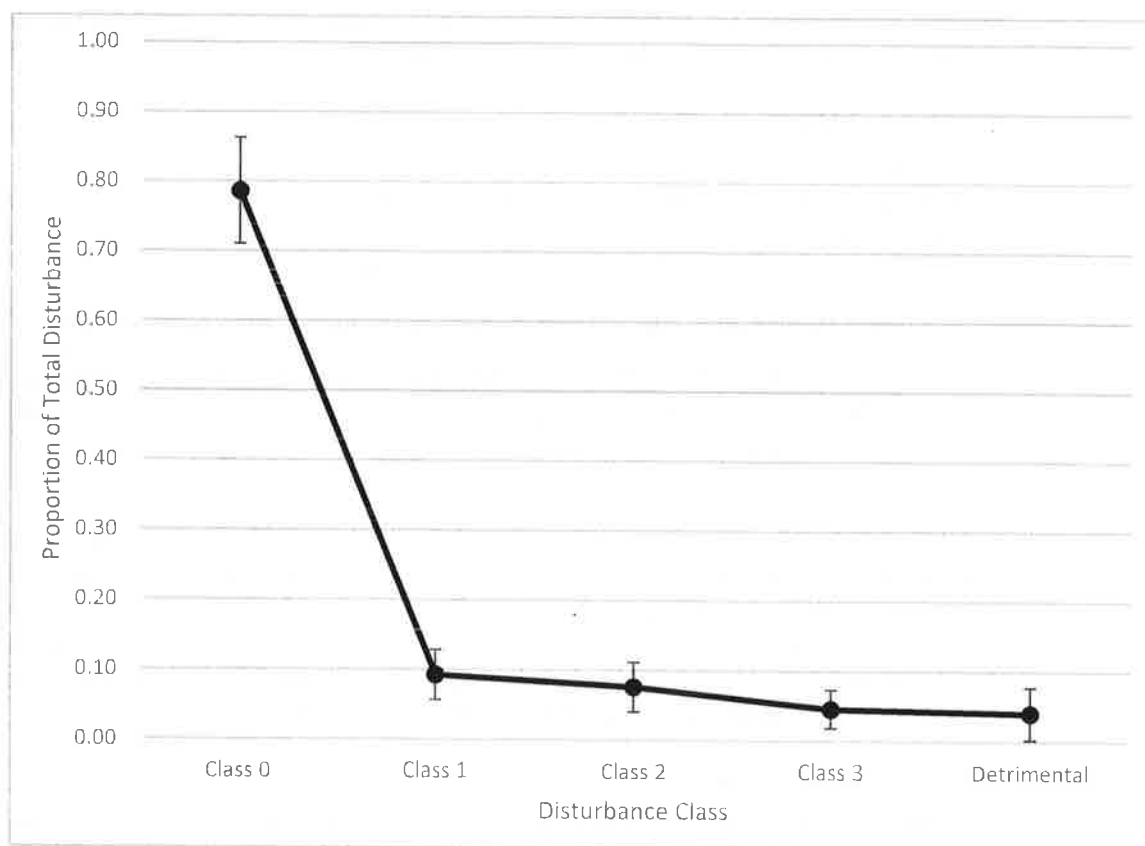
### Post-Harvest Monitoring Results

Since 2014, soil disturbance has been evaluated in fifty stands following treatments ranging from commercial thinning to clearcut with reserves and site preparation. Treatments occurred during different times of the year, within varying terrain, soil types, and vegetation communities. Summary statistics from those 2014-2017 observations are shown in table 56.

**Table 56 2014-2017 Summary Soil Disturbance Statistics in Fifty Stands Following Treatment**

Summary Statistic	Proportion Class 0	Proportion Class 1	Proportion Class 2	Proportion Class 3	Proportion Detrimental
Average	0.79	0.09	0.08	0.05	0.04
Minimum	0.03	0.00	0.00	0.00	0.00
Maximum	1.00	0.58	0.54	0.53	0.74
Standard Deviation	0.28	0.13	0.13	0.10	0.13
95% Confidence Interval Range	0.71 to 0.86	0.06 to 0.13	0.04 to 0.11	0.02 to 0.07	0 to 0.08

All post-harvest monitoring stands had an average of 79 and 5 percent of the treatment area in Classes 0 and 3 respectively. On average, 4 percent of the treatment area was detrimentally disturbed in stands. Figure 15 shows that the greatest proportion of soil disturbance amongst all of the post-harvest monitoring stands from 2014-2017 was recorded in lower disturbance classes, decreasing sharply as disturbance class increases. Of further note, the greatest variation generally occurred at lower levels of disturbance.

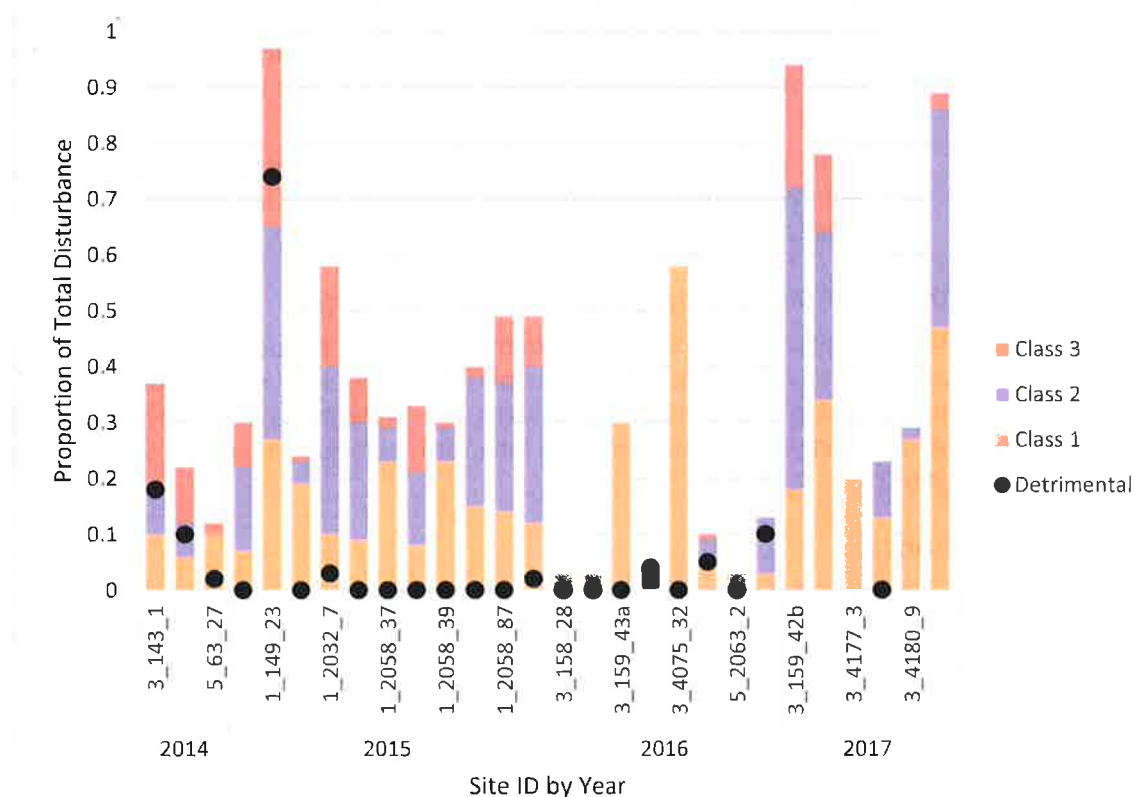


**Figure 15 2014-2017 Average post-harvest disturbance by soil disturbance class showing the 95 percent confidence interval**

Of the fifty stands evaluated for post-harvest soil disturbance, only twenty-eight were observed with soil disturbance. As with past Forest Plan monitoring assessments (USDA-FS 2014, 2015),

minor rutting and topsoil displacement appear to be the most commonly noted disturbances in the field. Where compaction was noted, it was generally observed as platy soil structure in heavier textured soils within the first 10 centimeters of the soil surface. Soils were also designated as compacted near the soil surface in the few areas observed with moderate to deep rutting.

Where historic data and existing landscape conditions were recorded, along with a cursory review of information from other stands, there were no notable soil disturbance trends distinguishing differences amongst the stands based on terrain, soil types, or existing vegetation. There was some evidence, however, that stands with mechanical site preparation treatment generally had higher soil disturbance, including detrimental disturbance. Figure 16 shows soil disturbance from 2014-2017 by site, including the proportion of detrimental disturbance observed.



**Figure 16 2014-2017 Post-Harvest Soil Disturbance Greater Than Class 0**

### Discussion

Overall, past soil disturbance monitoring over the period of record indicates that harvest activities alone have resulted in little soil disturbance and Forest Plan desired conditions and objectives are generally being met, but care must be taken in extrapolating such a small dataset over a short span of years monitoring. Stands with higher disturbance were generally those with harvest treatments followed by site preparation, but site preparation alone was not always an indicator of detrimental soil conditions, which was also a small percentage of what had been observed. Also, of note is some discrepancy in soil disturbance evaluations from year to year.

Notably, evaluations in 2016 appear to diverge from those recorded over the entire period of record. In addition, there's some indication of inconsistency with how detrimental soil conditions are determined.

### *Recommendations*

- Additional stands need to be monitored to tease out potential differences amongst treatments, terrain features, seasonal operation, soil types, and vegetation conditions. Particularly, more pre-harvest monitoring is needed to better assess the effects of forest management activities and validate whether soils have recovered from past treatments.
- Based on the higher disturbance recorded for site preparation activities it may be more appropriate in future assessments to stratify monitoring by harvest with and without site preparation.
- There is a need for more consistency in how the Forest Soil Disturbance Monitoring Protocol is implemented, particularly there is a need for additional training in determination of detrimental soil conditions. Better pre-monitoring planning and acquisition of historic data and existing landscape conditions will help facilitate that effort.
- There are opportunities to increase the amount of stands evaluated in any given year by incorporating current technology (e.g. tablets with ArcCollector and Avenza applications) to improve data collection efficiency.

### *Evaluation of Monitoring Question and Indicator(s)*

Although the general level of soil disturbance is low over the period of the monitoring record for post-harvest evaluations, some of the pre-harvest evaluations had some soil disturbance. Further evaluation of this monitoring question and indicator is necessary to ensure forest management activities are not affecting long-term soil productivity and viability of natural ecosystems.

### *References*

- Gries, Jim, and J. A. Efta. March 13, 2012. 2011 Timber Harvesting Soil Disturbance Monitoring Report. United States Department of Agriculture, Forest Service, Hiawatha National Forest.
- Page-Dumroese, Deborah, Ann Abbott, Tom Rice. 2009a. Forest Soil Disturbance Monitoring Protocol, Volume I: Rapid Assessment. United States Department of Agriculture, Forest Service. General Technical Report WO-82a.
- Page-Dumroese, Deborah, Ann Abbott, Tom Rice. 2009b. Forest Soil Disturbance Monitoring Protocol, Volume II: Supplementary Methods, Statistics, and Data Collection. United States Department of Agriculture, Forest Service. General Technical Report WO-82b.
- U.S. Department of Agriculture, Forest Service (USDA-FS). 2004. Land and Resource Management Plan. U.S. Department of Agriculture, Forest Service, Chippewa National Forest. Cass Lake, MN.
- U.S. Department of Agriculture, Forest Service (USDA-FS). August 2014. Monitoring and Evaluation Report FY 2014. U.S. Department of Agriculture, Forest Service, Chippewa National Forest. Cass Lake, MN.



U.S. Department of Agriculture, Forest Service (USDA-FS). August, 2015. Monitoring and Evaluation Report FY 2015. U.S. Department of Agriculture, Forest Service, Chippewa National Forest. Cass Lake, MN.

U.S. Department of Agriculture, Forest Service (USDA-FS). November 23, 2010. Forest Service Manual 2500 – Watershed Management, Chapter 2550 – Soil Management, 2550.5 - Definitions. WO 2500-2010-1.

## 9. Special Uses

A special-use authorization is a legal document such as a permit, term permit, lease, or easement, which allows occupancy, use, rights, or privileges of National Forest System lands. The authorization is granted for a specific use of the land for a specific period of time. For most authorizations, there is a cost. Types of costs for authorizations are: Cost Recovery Fees- An assessment of fees to recover agency processing costs for special use applications and monitoring costs for special use authorizations. These fees are separate from any fees charged for the use and occupancy of National Forest System lands. Land Use Fees are annual rental fees based on the fair market value for the uses authorized and is payable in advance. Fees are established by appraisal or other sound business management principles. Other Associated Costs applicants may be responsible for may be to provide information and reports necessary to determine the feasibility and environmental impacts of their proposal; compliance with applicable laws and regulations; and terms and conditions to be included in the authorization.

### Key Points

The Special Uses program provides services supporting our national policy and federal land laws by authorizing uses on National Forest System lands. With the Chippewa National Forest's checkerboard ownership, there are many opportunities and needs to cross National Forest System lands to reach other ownerships. In addition, due to the location of lakes on the Forest, several recreational opportunities were provided such as private resorts, recreation residences, and organizational camps.

The Forest works with a diverse pool of customers including private citizens, utility companies, oil and gas companies, resorts businesses, non-profit agencies, tribal governments, state and local governments as well as other federal agencies. In Fiscal years 2016 and 2017, 677 and 647 special use permits were issued that generated \$ 1,264,657 and \$1,266,694 in revenue, respectively.

The Chippewa National Forest offers a variety of special forest products to the public for personal and commercial uses. Many of the special forest products including balsam boughs and firewood are economically and culturally significant to the public.

### Monitoring Questions

Does Forest management of forest product, recreation and other special use permits meet Forest Plan and agency direction?

#### *Last Updated*

2004

#### *Monitoring Indicator(s)*

Review of the multiple factors in special use permits including the number, type, revenue, number expired, renewed and issued, number out of compliance. Policy (handbook/manual) specific to the Chippewa National Forest outside of Regional and National direction.

Forest product permits types and number issued.

#### *Monitoring Frequency*

Measure and report 2 years

### *Background and Drivers*

The Forest Plan provides desired conditions, objectives, and guidelines pertaining to special uses at:

D-REC-5	O-SU-3	D-TS-5
O-SU-1	O-SU-4	G-VG-2
O-SU-2	O-SU-5	

The Special Uses program provides services supporting our national policy and federal land laws by authorizing uses on National Forest System lands. With the Chippewa National Forest's checkerboard ownership, there are many opportunities and needs to cross National Forest System lands to reach other ownerships. In addition, due to the location of lakes on the Forest, several recreational opportunities were provided such as private resorts, recreation residences, and organizational camps.

The Forest works with a diverse pool of customers including private citizens, utility companies, oil and gas companies, resorts businesses, non-profit agencies, tribal governments, state and local governments as well as other federal agencies.

In 2006, the Forest Service adopted final regulations to recover costs associated with processing applications for special use authorizations.

There are several special forest products permits issued on the Forest including balsam boughs, Christmas trees, walking sticks, maple taps, birch bark and firewood. Demand for balsam boughs remains steady and demand for firewood is usually dependent on home heating prices and weather conditions.

### *Monitoring Indicator 1 – Special Use Permits*

**Table 57 Special Uses Permits by Type and Revenue in 2016 and 2017**

Type of Permit	2016 Number of Permits	2016 Revenue (\$)	2017 Number of Permits	2017 Revenue (\$)
Miscellaneous	12	3,064	5	3,183
Organization Camp	4	1,389	4	1,891
Recreation Residences	286	1,138,308	286	1,148,359
Resorts	10	43,665	10	54,220
Oil and Gas Pipeline	3	22,651	3	23,125
Powerlines	13	1,157	9	1,181
Railroads	2	0	2	0
DOT Easements	31	0	30	0
FRTA Easements	73	0	71	0
FLPMA Easements	22	2,061	22	144
FLPMA Permits	196	19,095	182	6,237
Communication Towers	4	5,367	3	5,410
Communication Line Permits	10	6,866	11	7010
Service Buildings/VIC	3	19,678	2	14,034
Outfitters and Guides	8	1,356	7	1900
<b>Totals</b>	<b>677</b>	<b>\$1,264,657</b>	<b>647</b>	<b>\$1,266,694</b>

**Table 58 Permits expiring/out of compliance**

Year	Expired	Out of Compliance
2016	18	0
2017	19	0

**Table 59 Cost Recovery Fees collected**

Year	Minor Cost Recovery Fee's collected
2016	\$4,260
2017	\$2,710

The Forest has two handbooks specific to management of special uses. The handbooks include:

Forest Service Handbook 2709.11 – Special Uses, Chapter 40 – Special Uses Administration (Supplement No: R9 Chippewa 2709.11-2010.1)

Forest Service Handbook 2709.11 – Special Uses, Chapter 30 – Resorts and other Concessions involving Privately-Owned Improvements (Supplement No: R9 Chippewa 2709.14-2014.1)

### ***Discussion Summary of Monitoring Indicator #1***

In the Eastern Region, the Chippewa National Forests holds the most Recreation Residence permits. Management of these permits require considerable oversight due to the restrictions in the permit terms. In addition, 89 cabins are considered eligible for the National Historic Register and require additional oversight.

Resort permit oversight is another permit type requiring considerable oversight by staff. Two of the ten permitted resorts on the Forest are eligible for the National Historic Register. In 2016 and 2017, the Forest contracted to obtain historic evaluations done for two resorts. One resort was determined to be eligible while a second resort was determined to be ineligible.

The Forest generates over 20 percent of the Eastern Region special uses income, mainly due to the number of recreation residence permits.

The Forest generally keeps permittees in compliance with their permits but in recent years have been overwhelmed with the number of proposals needing review.

Cost recovery fees come back to the Forest to cover salary expenses for staff time related to permit administration.

### ***Monitoring Indicator 2 – Forest Products***

**Table 60 Forest Products**

Year	Christmas Trees	Balsam Boughs	Firewood
2016	\$1005	\$1650	\$5560
2017	\$510	\$1650	\$5200

***Discussion Summary of Monitoring Indicator #2***

Special forest products continue to be in demand from the Forest. A new emerging demand from the Forest is decorative birch poles and spruce tops. While not currently permitted for gathering on a personal or commercial basis, the Forest will need to consider the sustainability of harvesting birch poles and spruce tops as the market demand for these products is very high currently in northern Minnesota.

***Recommendations***

The Forest continues to ensure special uses and forest products permits remain in compliance. Special Uses is adding a 0.5 FTE position to assist with the management due to the increased requests.

The Forest will be evaluating opportunities in future years to find opportunities to be more efficient with reviewing permit requests with creating review processes and by drafting forest wide Environmental Analysis for existing roads that may be issued a special use road permit.

In addition, there is a need to complete a historical evaluation for one resort to complete the evaluations for all 10 resorts.

***Evaluation of Monitoring Question and Indicator(s)***

Understanding the different uses on the Forest is important as well as where the revenue is generated for the Forest Service.

***References***

Special Uses Database Program

Cut and Sold Report from the Corporate Database Warehouse (CDW)

## 10. Timber

National Forest Management Act (NFMA) (1976) allows timber harvest only where there is assurance that such lands can be adequately restocked within five years after harvest. Regeneration may occur naturally or by planting or seeding. Stocking surveys on regenerated stands are conducted the first, third and fifth years after harvest to assess stocking levels. Most planted sites require at least the full five years to be adequately stock. Natural regeneration of hardwoods can usually be certified as adequately stocked following the third year stocking survey. What constitutes adequate stocking is defined in individual prescriptions and is dependent on objectives.

### Key Points

Regeneration harvest acres were certified stocked within five years 78 percent of the time in FY2016 and 61 percent of the time in FY2017. Sites not certified within the 5 year period are still in a stage of regeneration, just not yet certified. Barriers to compliance are primarily caused by predation by deer and rabbits, as well as competition from woody and herbaceous vegetation. Success was greatest on coppice cuts (aspen regeneration) sites with natural regeneration of hardwood/aspen from suckers and sprouts.

### Monitoring Question

Are harvested lands adequately restocked within five years following harvest?

#### *Last Updated*

This question has remained the same since the 2004 Forest Plan was implemented. It originated with NFMA in 1976.

#### *Monitoring Indicator(s)*

Acres of regeneration harvest, acres certified within 5 years of harvest; percent certified stocked within 5 years of harvest.

#### *Monitoring Frequency*

On-going through every field season in the form of Stocking Surveys.

#### *Background and Drivers*

The Forest Service harvests timber from National Forest System lands only where there is assurance that such lands can be adequately restocked within five years after harvest (National Forest Management Act (NFMA) (1976)). The certification process is how the Forest Service has chosen to indicate sites are adequately regenerated following harvest. Many variables enter into the successful establishment of tree regeneration. On the Chippewa competition from woody shrubs, sod, and deer browse are primary deterrents to meeting the objective. Up to one third of sites need to be replanted (following an initial planting) due to tree mortality.

***Monitoring Indicator 1 Acres of regeneration harvest, acres certified within 5 years of harvest; percent certified stocked within 5 years of harvest***

**Results and Discussion**

Table 61 displays the primary activities that the Chippewa National Forest employs to establish regeneration following a harvest. Planting is the primary means to establish regeneration where conifers are the desired future condition. Natural regeneration is largely hardwood regeneration (including aspen).

Release consists of hand cutting of brush. The Chippewa National Forest has generally good sites. Good sites have brush competition. Hazel species are the primary competitor, but *Rubus* sp. can also be problematic where they occur. Aspen suckers are also unwanted competition when converting sites to conifers. Sedge and grass mats (sod) can also be challenging on some sites. There is little that can be done in these cases without the use of herbicides.

Deer and rabbit predation of young trees is an on-going problem. Nothing is done regarding rabbits. For deer browse, bud capping is done.

**Table 61 Acres of accomplishment in FY 2016 and FY 2017 for reforestation activities**

<b>Reforestation Accomplishments Activity</b>	<b>2016 (acres)</b>	<b>2017 (acres)</b>
Planting	1,811	1,929
Seeding	64	0
Site Prep for Natural	345	591
Certification of Natural Regeneration without Site Preparation	1,232	1,850
Site Prep for Planting or Seedling	848	502
Release	2,707	2,700
Animal Damage Control	3,202	2,782

Table 62 and table 63 show the regeneration harvest acres and percent certified stocked within five years. In FY2016, 78 percent of all regenerative harvests from 2011 were certified as stocked. In FY2017, 61 percent of all regenerative harvests from 2012 were certified as stocked. Success was greatest on coppice cut sites with natural regeneration of hardwood/aspen from suckers and sprouts.

Stocking surveys are the mechanism by which certifications of regeneration are based on. In FY2016 the forest conducted 321 stocking surveys covering 5,787 acres. In FY2017 the Forest conducted 371 stocking surveys covering 6,915 acres.

Table 62 FY 2011 Regeneration harvests and certifications in 2016

Harvest Type	FY 2011 Regen Harvests	FY 2011 Regen Harvest Acres	FY 2011 Regen Harvest Acres Certified by FY 2016 End	Percent Certified Stocked Within 5 Years
Coppice Cuts	22	468	459	98%
Clearcuts	43	631	447	71%
Selection Cuts	16	446	299	67%
Seed Tree Cuts	0	0	0	
<b>All Regeneration Harvests</b>	<b>81</b>	<b>1,545</b>	<b>1,205</b>	<b>78%</b>

Table 63 FY 2012 Regeneration harvests and certifications in 2017

Harvest Type	FY 2012 Regen Harvests	FY 2012 Regen Harvest Acres	FY 2012 Regen Harvest Acres Certified by FY 2017 End	Percent Certified Stocked Within 5 Years
Coppice Cuts	8	105	91	87%
Clearcuts	70	1,111	604	54%
Selection Cuts	19	510	350	69%
Seed Tree Cuts	2	12	12	100%
<b>All Regeneration Harvests</b>	<b>99</b>	<b>1,738</b>	<b>1,057</b>	<b>61%</b>

*Recommendations*

No changes to management practices or direction are recommended. A new staff plan has been adopted that should increase available staff. Tracking and maintain data on all the sites is a challenge and more staff may be required in the future to help with that aspect of the program.

*Evaluation of Monitoring Question and Indicator(s)*

No recommendations.

**Monitoring Question**

Is white pine being increased on the landscape?

*Last Updated*

2004

*Monitoring Indicator(s)*

White pine frequency on the Forest landscape.

*Monitoring Frequency*

Bi-annually.

*Background and Driver*

36 CFR 219.12(a)(5)(iii)

The status of focal species to assess the ecological conditions required for diverse plant and animal communities.



White pine is a high profile tree species in the forests of northern Minnesota and was selected as a management indicator species because:

- population changes are believed to indicate effects of forest management
- it is a species with many social, economic and ecological values
- it addresses major management issues about how much and where to promote white pine for
- its important wildlife habitat features, timber value, scenic quality, and role in maintaining ecologically healthy forest composition and structure
- it is considered to be a keystone species, in that its overall effects on critical ecological processes and biodiversity are greater than would be predicted by its abundance.

### *Monitoring Indicator 1*

Amount of white pine as a component of other forest types based on frequency in regeneration and non-regeneration plots.

Acres and percent of white pine forest type by landscape ecosystem

### *Monitoring Frequency*

2 years

### **Results**

**Table 64 Frequency of white pine on regeneration and non-regeneration plots (2017).**

	<b>Total Plots</b>	<b>Plots w/WP</b>	<b>Frequency</b>
Regeneration Plots	11,371	2,486	22%
Non-regeneration Plots	66,407	8,113	12%

### **Discussion**

To assess the results of white pine occurrence and management, common stand exam plots were used. There are currently 77,778 plots in FSVeg that are valid (not archived). These are distributed across the Forest in every forest type, and are divided into two strata. One strata representing stands that are not in a regeneration state. This means they have not recently had any activity in them and are generally intermediate or mature in age. The other strata represents plots found in regenerating stands where regeneration harvests have occurred. Frequency of white pine (the presence or absence of white pine on a plot) in each strata was calculated (table 64). All plots are of the same size, and all sampling followed the same sample design. According to these data the Forest is regenerating white pine at a frequency nearly twice that found on the landscape in general, in Forest Service administered stands without recent management activities.

Regeneration harvests include clearcuts, shelterwood cuts with reserves, seed tree and selection harvests. Regeneration methods include planting of seedlings, artificial seeding, natural seeding, and coppice. Overstory trees are present on some of the regeneration plots, depending on the type of harvest and location of the plot. White pine is often a reserve species in harvests, though planted seedlings contribute considerably to the increased frequency on regeneration plots.

**Monitoring Indicator 2****Regeneration of white pine****Results****Table 65 White pine planted.**

<b>Year</b>	<b>WP Seedlings Planted</b>	<b>WP Seed Sown</b>
2004	218,500	
2005	194,000	
2006	221,350	
2007	168,200	
2008	137,000	
2009	214,810	
2010	289,000	
2011	166,000	51.22 pounds
2012	150,000	50.9 pounds
2013	319,000	6 pounds
2014	473,500	
2015	370,000	43.16 pounds
2016	535,400	50.5 pounds
2017	426,000	16 pounds

**Discussion**

Table 65 displays the number of white pine seedlings and seed planted each year starting with 2004 when the current Forest Plan was implemented. Generally 3 to 4 ounces of seed is applied per acre when artificially seeding.

**Recommendations**

None.

## 11. Transportation

The Chippewa National Forest aspires to provide the minimum road system needed that is safe and efficient to access areas throughout the Chippewa National Forest. In 2015, the Forestwide Travel Analysis took a scientific look at many risks and benefits of the current transportation system to help identify this potential minimum road system. All Chippewa National Forest system roads now have a “likely needed” or “likely not needed” classification to help move towards a minimum necessary road system. This science-based information will inform staff during project planning efforts, prioritizing road maintenance, improvement projects or proposed road decommission activities.

### Key Points

There was an emphasis on road inventories in the last two years to improve the maps and database to more accurately reflect actual ground conditions. This accounts for some of the mileage changes between Operating and Objective. The entire Forest road inventory was completed by December, 2018.

Objective-TS-8 of the Forest Plan was to decommission 200 miles in the first decade. This Objective was met. The overall road system miles decreased by another 98.9 miles since the 2014 Monitoring plan. The Forest continues to decommission more roads to downsize the transportation system to reach the minimum system needed while still providing adequate access.

### Monitoring Question

To what extent is the Forest, in coordination with other public road agencies, providing safe, cost effective, minimum necessary road systems for administrative and public use?

#### *Last Updated*

The 2014 Monitoring and Evaluation Report is the last know update for this monitoring question. (Chippewa National Forest, 2014)

#### *Monitoring Indicator(s)*

Indicators: Miles of road inventoried by Operational Maintenance Level

#### *Monitoring Frequency*

Master Road inventory every 5 years for Operational Maintenance Level Roads 3, 4, and 5.

#### *Background and Drivers*

The National Forest Service System roads provide access to federal forest land, and also to state, county, tribal and private land. Some roads are maintained for safe use by passenger cars (ML 3, 4, 5), some roads are for high-clearance vehicle use (ML 2), and some roads are closed from all vehicle traffic (ML1). The higher the maintenance level number, the more it costs to maintain the safety and environmental concerns for that corridor. The land base is a checkerboard of ownership, which also leads to the necessity of the “seamless” interface with public roads for Forest users to maneuver through the Forest.

The following Desired Condition and Forest Plan Objectives (Chippewa National Forest, 2004) help to quantify the monitoring need:

D-TS-1

D-TS-4

O-TS-6

D-TS-2

O-TS-1

O-TS-7

D-TS- 3

O-TS-2

O-TS-8

### Monitoring Indicator 1

#### Results

Table 66 provides a snapshot of the mileages by maintenance level from January 2017. Road inventory is an ongoing activity and the numbers can change as inventory information becomes available. There is a five year inventory cycle that will begin in 2018 which will record the official miles of additions and deletions to the official system of record. No new roads were constructed during this monitoring period.

**Table 66 Chippewa National Forest Transportation System by maintenance level**

Mtce Level (ML)	Objective ML (miles)	Operational ML (miles)	Difference Operating - Objective	Explanation	Maintained in 2015 (miles & %)	Maintained in 2016 (miles & %)
1	279.8	274.2	-5.7	Less operating at optimal ML	82 4%	114 6%
2	1419.8	1655.3	235.5	More miles Operating at higher ML		
3	248.1	192.5	-55.6	Less operating at optimal ML	399 89%	405 90%
4	237.0	234.2	-2.8	Less operating at optimal ML		
5	27.0	21.5	-5.5	Less operating at optimal ML		
Decom.	166.0	0.0				
<b>TOTAL</b>	<b>2377.7</b>	<b>2377.7</b>				

Data: NRM (1/5/2017) System = Forest Service = Jurisdiction; Status = Existing

Each National Forest Service System Road has an objective and an operational maintenance level. As the chart above displays, there are significantly more roads operating at a Level 2. Only 6 percent of these roads receive any maintenance. All of the passenger-car designated roads are functioning at a level lower than desired also due to lack of maintenance. There are 166 miles of roads with decisions on file to decommission which could further reduce our mileages. This is a backlog that is dealt with as time and funding permits.

#### Discussion

There was an emphasis on road inventories in the last two years to improve the maps and database to more accurately reflect actual ground conditions. This accounts for some of the mileage changes between Operating and Objective. The entire Forest road inventory should be complete by December, 2018.

Objective-TS-8 of the Forest Plan was to decommission 200 miles in the first decade. This Objective was met. The overall road system miles decreased by another 98.9 miles since the 2014 Monitoring plan. The Forest continues to decommission more roads to downsize the transportation system to reach the minimum system needed while still providing adequate access.

### Recommendations

Maintenance tasks done on Forest Service roads are hovering near the minimum allowable. Partnering with other public road agencies and the Leech Lake Band of Ojibwe increases our capacity to provide improved services. Trends show more people are moving to the area creating increased residential traffic, and higher expectations. The additional maintenance by our partners increases the “seamless” interface, where the traveling public enjoys more comfortable drives without concern for who owns the road.

The Forest is moving towards the minimum road system. Ongoing road inventories will aid in identifying more roads that may be included in the “Likely Not Needed” category, further downsizing the mileages. Less miles means less maintenance expense. It also means less access for popular activities and recreation opportunities. More public involvement is expected as more decisions will determine the future road system.

### Evaluation of Monitoring Question and Indicator(s)

Improvements to the monitoring of closed roads is needed (ML1).

Roads that are gated for wildlife nesting areas should be checked to ensure the nest is still active.

There also needs to be a change in Forest direction of Off-highway vehicle use behind some gates. Previous direction was to allow vehicles under 1,000 pounds to drive around gates to continue to use the road. This creates confusion by users that all gates can be driven around, which is not always allowable.

### References

Chippewa National Forest. 2004. Land and Resource Management Plan. Milwaukee: United States Department of Agriculture.

Chippewa National Forest. 2014. Monitoring and Evaluation Report. Milwaukee: USDA Forest Service - Eastern Region.

## 12. Tribal Rights and Interests

This section includes three monitoring questions related to tribal rights and interests. The first addresses sustaining American Indian's way of life, followed by a discussion on the government to government relationship between the Leech Lake Band of Ojibwe (Band) and the Chippewa National Forest, and finally information on facilitating the legal rights of the Tribe to hunt, fish, and gather.



The Leech Lake Tribal Council is the governing body of the Band with offices located in Cass Lake, Minnesota, and is a member of the Minnesota Chippewa Tribe. The Tribal Council consists of a Chairman, Vice Chairman, District 1 Representative, District 2 Representative, and District 3 Representative.

Eleven Indian communities make up the reservation, all of which are located within the proclamation boundary of the Chippewa National Forest. Cass Lake is the largest community within the reservation. In addition to Cass Lake, there are Ball Club, Bena, Inger, Onigum, Mission, Pennington, Smokey Point, Sugar Point, Oak Point, and S. Lake. Oak Point had previously been known as Squaw Point, and S. Lake had previously been known as Squaw Lake.

The relationship between the Leech Lake Band of Ojibwe and the Chippewa National Forest is unlike any other in the Forest Service system. The Chippewa National Forest was formed out of lands that had originally been set aside in the mid-19th century to serve as the treaty guaranteed homeland for the Leech Lake Band of Ojibwe. This results in immense overlap today with approximately 90 percent of the Leech Lake Indian Reservation being found within the Chippewa National Forest, and approximately 45 percent of the Forest being found within the Reservation. This inextricably binds the management of the Chippewa National Forest with the social and economic well-being of the Leech Lake Band.

In addition to the practical implications of this overlap, the fact that the Chippewa National Forest was created by statute with provisions calling out specific obligations to the Leech Lake Band, amplifies the legal trust obligation owed by the United States to the Band. In the first major treaty rights case in Minnesota, known as the Herbst decision, the United States District Court affirmed the retained treaty rights of the Band on the reservation. Further, during the course of this litigation, the United States asserted on behalf of the Band that treaty protected rights to hunt, fish and gather on the Leech Lake Indian Reservation are property rights held by the Band. Therefore, virtually all management activities on the Chippewa National Forest have the potential to affect rights protected by the "Just Compensation clause" of the Fifth Amendment of the United States Constitution.

### Key Points

The Forest has a legal obligation to uphold its Federal Trust responsibility to the Leech Lake Band. A Memorandum of Understanding (MOU) signed by LLBO and the Chippewa National Forest in 2013 expresses the will of each to work together to conserve resources significant to the Band's way of life and cultural identity. Pursuant to recommendations identified in a letter from the Chief of the USFS to the Band's Chair, the MOU is being amended to include provisions for achieving the Band's desired vegetation conditions on National Forest System Lands by developing a shared decision making model for commercial timber harvesting and other natural resource considerations, utilizing Traditional Ecological knowledge offered by the Band, and expanding the use of the Tribal Forest Protection Act.

## Monitoring Questions

1. Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being? Is the Forest facilitating the right of the Tribes to hunt, fish, and gather as retained via treaty?
2. Are government to government relationships functional?

### *Last Updated*

The second question in #1 was added and was previously listed as a separate question. Questions are linked to the MOU between LLBO and Chippewa National Forest. Also, new MOU with NW IOC will tie into this.

NEPA comments also tie into this.

Addressed in Tribal Relations Annual Report

### *Monitoring Indicators*

Question 1: Consultation on NEPA documents, and other FS proposed work; compliance with MOU, and summary of key info in Tribal Relations Report.

Question 2: Compliance with MOU, NEPA, and THPO.

### *Monitoring Frequency*

Question 1: annual monitoring with a report every 2 years.

Question 2: every 2 years.

### *Background and Drivers*

There are numerous locations throughout the Forest that have traditional, cultural, and spiritual significance to the Band. The use and protection of these areas is essential to maintaining traditional links to past generations.

The continued availability of traditionally utilized natural resources is crucial to Ojibwe culture. Now, as in the past, many places throughout the landscape are visited during a yearly cycle to collect food, medicinal plants, and other materials, as well as for religious practices and social gatherings. Plants and animals gathered from openings, aquatic environments, and forests provide sustenance. The traditions of gathering these and other natural resources continue to be economically and spiritually important. Because of its concern with the continuation of this aspect of Ojibwe culture, the Band takes an active role in the protection and restoration of many species of plants, animals, and fish. The Band also emphasizes that access to these resources and traditional cultural places is an inherent right.

Pursuant to recommendations in a September 12, 2016 letter from the Chief of the USDA Forest Service to the Leech Lake Band of Ojibwe's chairwoman, and a renewed understanding of the unique relationship between the Chippewa National Forest and the Leech Lake Band of Ojibwe, the parties agreed to amend the 2013 Memorandum Of Understanding (MOU) between the Band and the Chippewa National Forest.

Though negotiations have not been completed, the purpose of the amended MOU will be to provide a framework for cooperation between the Forest Service and the Band for natural

resource management, economic development and employment, training and education, maintaining Ojibwe cultural life-ways, and regulatory jurisdiction on National Forest System lands and trust lands within the boundaries of the Leech Lake Reservation and the 1855 Ceded Territory.

The amended MOU will include provisions for achieving the Band's desired vegetation conditions on National Forest System Lands by developing a shared decision making model for commercial timber harvesting and other natural resource considerations, utilizing Traditional Ecological knowledge offered by the Band, and expanding the use of the Tribal Forest Protection Act.

The forest plan includes desired condition and objectives at:

Question 1: D-TR-1, O-TR-1, O-TR-3, D-TR-3

Question 2: D-TR-2, O-TR-2, O-TR-4

## **Monitoring Question 1**

Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being? Is the Forest facilitating the right of the Tribes to hunt, fish, and gather as retained via Treaty?

### ***Results***

The Chippewa National Forest has worked with the Band in a variety of ways in efforts to improve the American Indian's way of life, cultural integrity, social cohesion, and economic well-being. This has been primarily through contracts and agreements to help support local crew work through stewardship contracts, grants and agreements, and training. The Forest has also coordinated with the Band by providing training, working together to complete ecosystem restoration, prescribed burning, impoundment management, road maintenance, management of heritage resources, lands review, and public affairs.

### **Stewardship Contracts**

The Forest Service collaborated with Band on a stewardship contract to treat areas and deliver firewood to the Band. This integrated resource timber contract includes the removal of timber in exchange for a variety of service work on the Forest. The collaboration and negotiation process used was beneficial to both the Forest and the Band for future work on the Forest through stewardship contracts and agreements.

The Forest Service has included the generation of fuelwood in several recent integrated resources timber contracts on the Chippewa National Forest for use by the Band. Fisherman's Stewardship includes the treatment of 20 acres of upland hardwoods on the Forest and the delivery of fuelwood to Cass Lake for use by the Band. Holland Stewardship includes the treatment of black ash stands and the generation of gaps. The merchantable timber from this service work was harvested, forwarded and hauled by the contractor to a Forest Service gravel pit for stock piling and hauling by the Band and use as fuelwood for tribal members.

### **Firewood Gathering Coordination**

There has been regular coordination with the Band regarding firewood harvesting opportunities across the Forest resulting from recent Forest Service timber sale activities. This coordination



has included the sharing of sale area maps from timber sales and current information on recently completed harvest units and firewood opportunities.

Employees with the Band's Temporary Employment Program continue to exercise gathering rights across the Forest by sending out crews of employees and harvesting firewood and delivering to tribal members for home heating needs.

### Grants and Agreements

The following table displays some of the various grants and agreements with the Band, some of which have been in place for several years.

**Table 67 Grants and agreements between the Chippewa National Forest and the Band**

<b>Type of Agreement</b>	<b>Purpose of Agreement/Results</b>
Challenge Cost Share	Fruiting Shrub Improvement – FS Lands
Challenge Cost Share	Nature's Lake Restoration Project
Participating	Heritage Surveys
Participating	Roadside Hazardous Fuels Reduction
Participating	Sugar Maple Improvement Project
Participating	Windstorm Hazardous Fuels Reduction Project
Participating	Non Native Invasive Species Monitoring/Treatment
Participating	Fruiting Shrub Improvement – Non FS Lands
Participating	Tree Planting
Participating	Egg Lake Restoration Project
Collection Agreement	Knutson Dam Modernization Project
Challenge Cost Share	Sweetgrass Improvement Project
Challenge Cost Share	Rare Plant Surveys
Participating	Riparian Restoration and Cultural Resource Restoration Project
Challenge Cost Share	Snowshoe Hare Habitat Restoration Project
Participating	Internship Agreement with Tribal College
Participating	Job Training/Manpower Development

### Tribal Forest Protection Act Projects

The Tribal Forest Protection Act (TFPA) authorizes the Secretaries of Agriculture and Interior to give special consideration to land management projects proposed by Tribes on Federal lands bordering or adjacent to Indian Trust Lands in order to address threats to Tribal forestlands, including wildfire and disease. A total of three TFPA proposals were developed by the Band's Division of Resource Management, and approved by the Regional Forester in fiscal years 2016 and 2017. These include: Early thinning in young, overstocked, planted pine stands; Increasing habitat for snowshoe hare and other wildlife species; and Red pine and white spruce plantation restoration. The Forest will continue to consult with the Band on implementation of TFPA which will likely include utilizing stewardship contracting authorities directly with the Band.

### Tribal Timber Sale Coordination

Forest Service staff continue to work cooperatively with the Band's Division of Resource Management on tribal timber sales. This coordination has included access, designation of

miscellaneous federal timber to facilitate access, road permit review, property line location and coordination with purchasers for biomass utilization on tribal land.

#### Ottertail Transmission Line Mitigation

The Forest Service continues our work planting fruiting shrubs on both National Forest and Tribal lands. Several areas were planted that will enhance future berry picking opportunities for the Band.

#### Ecosystem Restoration

The Chippewa National Forest and the Band worked together to plant red and white pine seedlings in areas on the Forest.

The Band's Division of Resource Management continues to work on Hazardous Fuels projects commonly known as "Stevens' Funds." The \$225,000.00 Onigum Vicinity Hazardous Fuels Reduction Fuels Project grant treated 580 acres in the Onigum area of the Reservation. This project included thinning, brushing and prescribed burning.

The Band participated with the Forest in prescribed burning at Federal Dam and several other areas on the Chippewa National Forest.

The Band participated in staffing high fire danger occurrences.

The Band completed a Forest Service funded Community Wildfire Protection Plan for the Reservation.

Under agreement, the Forest has trained and employed band members in the identification and eradication of invasive plant species. The crew received training on identification of various invasive plant species, as well as observing exotic earthworm infestations, at sites across the forest. The crew conducted hand and mechanical invasive plant control treatment on both tribal and National Forest lands.

The Forest also partnered with Leech Lake Tribal College on a wetland mapping and assessment project.

#### Engineering

The Forest implemented the Egg Lake Impoundment decommissioning project with the Band.

The Forest coordinated routine maintenance work at impoundments under an impoundment agreement with the Band.

The Forest updated the road maintenance cooperative agreement with the Band to blade and snowplow many roads.

The Forest completed a number of stewardship road proposals, including road re-establishment, blading, etc.

The Band assisted with a road emergency flooding issue when the Chippewa National Forest was shorthanded.

The Forest assisted the Band with emergency culvert supply.

### Heritage Resources Coordination

The Forest continues to consult with the LLBO Tribal Historic Preservation Office (THPO) for management projects while operating within the existing Programmatic Agreement with the LLBO THPO, the Minnesota State Historic Preservation Office, and the Chippewa National Forest.

### Lands/Recreation

The Forest assisted the Band with review of nearly 17,000 acres of National Forest System lands acquired through Secretarial Transfer Authority. The Band is pursuing legislation to transfer the parcels from National Forest System status to Indian Trust Lands.

The Forest accommodated free camping for tribal members in recognition of the Band's treaty reserved rights.

## Monitoring Question 2

Are government to government relationships functional?

### *Background*

Consultations occur on National and Regional issues and on local Forest projects. Consultation on Forest level projects impacting Treaty Rights has been an emphasis. The director of the Band's Division of Resource Management is authorized by Tribal Council Resolution to serve as the point of contact for the Band on all matters concerning the Forest Service. Line officers consult with the Leech Lake Division of Resource Management Director or delegated staff. Planning Team members and Line Officers on the Forest attend Local Indian Council meetings to provide and solicit information from Tribal communities on Forest Service projects planned within the reservation boundaries.

### *Results*

The Forest Service has been involved in an intensive consultation process over the past two years with the Band concerning a range of issues including desired vegetation conditions within the reservation. The result of this effort will be a signed Memorandum of Understanding between the Forest Service and the Band. Consultation under a MOU and with the Leech Lake Band of Ojibwe Tribal Historic Preservation Office (THPO) occurs for projects planned under the National Environmental Policy Act.

Other consultations occurred during project level analyses.

### *Recommendations*

Continue to work with the Band and employees of the Chippewa National Forest to strengthen cultural awareness, consultation, communication, employment and outreach, partnerships, and resource management.

Continue efforts that facilitate greater involvement of all Tribal members in Forest programs and activities afforded the general public.

Continue connecting leaders from both governments to help address key issues that have the potential to cause discord, and disrupt relations.

## 13. Watershed Health

### Key Points

Relevant BMP's were implemented and successful at all monitored sites. No current issues were affecting watershed health at any of the sites.

Forest management does not appear to affect water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems. Legacy impacts from roads and dams are still affecting the Forests watershed, however, current activities do not appear to be and in some cases are improving the watershed condition (e.g., Knutson Dam removal).

### Monitoring Question

To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems?

#### *Last Updated*

2004

#### *Monitoring Indicator*

BMP monitoring on effectiveness of measures to protect water quality.

#### *Monitoring Frequency*

Measure annually and report every 2 years

#### *Background and Drivers*

36CFR 219.12 (a)(5)(i) The status of select watershed conditions. (2012 PR)

All Forest Plan WS Desired Conditions and Objectives with the possible exception of D-WS-14, plus O-RWA-1 D-PH-3, D-PH-4, O-PH-3, O-TS-4 and O-TS-5.

The Forest monitored several different aspects in addressing this question.

- Best Management Practices (BMPs)
- Aquatic habitat restorations
- Vegetation management
- Recreation
- Road construction
- Mineral extraction
- Range management

Beginning in 2014, all national forests were required to monitor water quality best management practices (BMPs) annually for activities that occur on National Forest System lands. The monitoring program was developed to improve accountability and performance in managing water quality consistent with the Federal Clean Water Act and State water quality programs. Since 2014, the Forest has selected projects to evaluate core water quality BMP implementation and effectiveness. In 2016 and 2017, the Forest was assigned BMP categories associated with

grazing, ground-based skidding and harvesting, aquatic restoration, rock pits, developed recreation sites, water accesses, road construction, and mechanical stand treatments (table 68).

**Table 68 Location of core National Water Quality BMPs evaluated on the Forest in 2016-2017.**

<b>BMP Category</b>	<b>Project Location</b>
Grazing	Allotment – Blackduck District, Compartment 4, Stand 2
Ground-based skidding and harvesting	Grapevine Salvage harvest unit 34 UTM East 387907 North 5249508 Tall Meadow Stewardship stand 903010000137007000 UTM East 376953 North 5266382
Aquatic Restoration	Knutson Dam, outlet of Cass Lake (T146 R30 S21)
Developed Rec sites	Benjamin Lake UTM East 383860 North 5277447
Mineral extraction	School House Pit UTM East 419497 North 5282457 Scenic Pit UTM East 403900 North 5280909
Water Access Use	Lake Winnie (Birches) UTM East 414167, North 5253723 Third River UTM East 404281, North 5265862
Road Construction	FR 2930 under Shelly Timer sale contract, UTM East 391249 North 5245147
Mechanical Veg Treatment	Cass lake East Salvage Stand number 903011302053001000. UTM East 386236, North 5250882 Schley Salvage Stand number 903051302067009000 UTM East 386795, North 5274670

Completed projects were selected randomly for all sites except grazing and aquatic restoration because there was not a sufficient pool of sites in those categories. All projects had some interaction with the Aquatic Management Zone, an administrative zone adjacent to streams and other waterbodies (USDA 2012). Site location, project description, guidance documents (e.g. Forest Plan, EAs, operating and maintenance plans), photos, and BMP implementation and effectiveness were gathered and input in to a national FS database.

## Results

Relevant BMP's were implemented and successful at all monitored sites. No current issues were affecting watershed health at any of the sites. At the two water access sites, future maintenance was identified as a preventative measure to limit sediment and erosion (table 69).

**Table 69 Monitoring results of core National Water Quality BMPs evaluated on the Forest in 2016-2017.**

<b>BMP Category</b>	<b>Project Location</b>
Grazing	BMPs implemented and successful, no issues or corrections needed.
Ground-based skidding and harvesting	BMPs implemented and successful, no issues or corrections needed.
Aquatic Restoration	BMPs implemented and successful, no issues or corrections needed.
Developed Rec sites	BMPs implemented and successful, no issues or corrections needed.
Mineral extraction	BMPs implemented and successful, no issues or corrections needed. Minor trash waste noted near, but not in waterbodies.
Water Access Use	BMPs implemented and successful, no issues or corrections needed at this time. Future maintenance was identified at both sites to prevent water quality issues. Geotextile should be covered with gravel to prolong life and sediment retention

BMP Category	Project Location
	function at Birches. Ramp at third river needs adjustment to deter boaters from launching adjacent to the ramp.
Road Construction	BMPs implemented and successful, no issues or corrections needed.
Mechanical Veg Treatment	BMPs implemented and successful, no issues or corrections needed.

### *Recommendations*

Continue to implement forest plan, BMPs and MFRC Gold Book. A complete monitoring inventory of existing water associated rec sites and water accesses should be conducted on a routine basis because these sites tend to be less frequently monitored than activities related to current management projects where we have forest personnel observing the implementation.

### *Evaluation of Monitoring Question and Indicator(s)*

To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems? The implementation and effectiveness of BMPs was used as an indicator for this section of the report. For the 2016-17 monitoring cycle, Forest management does not appear to affect water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems. Legacy impacts from roads and dams are still affecting the Forests watershed, however, current activities do not appear to be and in some cases are improving the watershed condition, for example the Knutson Dam removal.

### *Reference*

FSM (Forest Service Manual). 2004. Watershed and Air Management, Watershed Protection and Management. Ch. 2520. U.S. Forest Service, National Headquarters. Washington, DC.

Minnesota Forest Resources Council. Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resource Managers. 2013. Minnesota Forest Resources Council, St. Paul, Minnesota. Gold Book. Available at: <http://www.mlep.org/efmg/fmgbook.pdf>

USDA Forest Service. 2004. Chippewa National Forest. Land and Resource Management Plan. Milwaukee: United States Department of Agriculture.

USDA. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. FS-990a. U.S. Dept. of Ag., Forest Service. Washington, DC.

## 14. Wildlife and Plants

### Key Points

All management activities were completed within 2004 Forest Plan direction for TES and Regional Forester Sensitive Species. Forest Plan standards and guidelines are being met

The Forest contributed toward the conservation and recovery of the Canada lynx, gray wolf, northern long-eared bat and rusty patched bumble bee through habitat and access management practices, collaboration with other federal and state agencies, as well as researchers, tribal bands and non-governmental partners.

The Forest will continue to plan on accomplishing annual wildlife outputs consistent with Forest Plan goals and objectives.

There has not been an increase in the snowmobile routes across the Forest.

### Wildlife Outputs

#### Monitoring Question

To what extent is Forest management improving aquatic and terrestrial wildlife habitat?

#### Monitoring Drivers

"36 CFR 219.12(a)(5)(vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.

#### Monitoring Indicators

Wildlife: Acres of terrestrial wildlife habitat treated  
 Aquatics: Acres of lake habitat treated  
 Miles of stream habitat treated

#### Results

The Chippewa National Forest accomplished 98 percent of the terrestrial wildlife acres, 100 percent of the aquatic lake acres and 100 percent of the stream mile outputs assigned by the Regional Office 2016 -17. Outputs are assigned each year by the Regional office that are consistent meeting the desired conditions and objectives in the Forest Plan. The Chippewa National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife. Table 70 displays planned and actual wildlife and aquatic outputs.

**Table 70 Planned and actual wildlife and aquatic outputs for 2016-2017**

Wildlife Output	FY2016 Actual (Planned)	FY2017 Actual (Planned)
Acres of wildlife habitat improved or restored	8,795 (8900)	8,410 (8600)
Acres of lake habitat improved or restored	35 (35)	35 (35)
Miles of stream habitat improved or restored	600 (600)	583 (600)

## Monitoring Question

To what extent is the Forest maintaining no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves lynx habitat through a net reduction of compacted snow areas?

### Monitoring Drivers

The Forest Plan includes the following standard and guidelines pertaining to wildlife:

S-WL-2

G-WL-6, 8

### Monitoring Indicators

Density (miles/square mile) of roads and snow-compacting trails by Lynx Analysis Unit.

### Background

All Grant-In-Aid (GIA) snowmobile trails on the Chippewa National Forest are operated and maintained through agreements with Cass and Itasca Counties. In turn the counties partner with local snowmobile clubs who perform grooming and trail maintenance. There are a total of 17 GIA trails on the forest.

Cross-country snowmobile travel is prohibited and has been since the 1986 Forest Plan. To provide a range of outdoor recreation opportunities the Chippewa National Forest maintains five non-motorized trail systems that are groomed for cross-country skiing. Grooming is performed by Forest Service personnel or through partnerships with other government agencies, clubs, or individuals.

The Lynx Conservation Assessment and Strategy (LCAS) is the guiding document that directs lynx conservation in the United States. The LCAS identified effects of roads and recreational winter trails are largely focused on winter access into lynx habitat (Ruediger et al. 2000).

Most recreational activities are unlikely to have a large effect on the prey base, unless the activity is concentrated within primary forging sites or directly reduces habitat and prey abundance. Recreation is more likely to impact lynx by compacting snow through over the snow trail routes, allowing competing predators to access lynx habitat; or by creating disturbances of a magnitude or timing that make a forging site largely less desirable for lynx.

### Results

**Table 71 Total Miles of Snowmobile & Cross Country Trails - 2017**

District	Trail	Miles
Deer River	Avenue of Pines	21.9
	Bowstring East	19.1
	Bowstring West	41.9
	Cameron	14.4
	Marcell North	14.2
	Marcell South	10.3
	Pipeline	8.5



District	Trail	Miles
	Suomi Hills	20.8
	Taconite	3.1
	Winnie	14.1
	Suomi Hills	20.5
Walker	Chippewa C	23.0
	Eagle Country	6.6
	Lost Girl	19.5
	Paul Bunyan	12.3
	Snoway One	7.3
	Soo Line	21.0
	Triville	18.8
	Shingobee	5.6
	Goose Lake	12.5
	<b>Total Miles</b>	<b>313.4</b>

Since 2004, there have been temporary reroutes of snowmobile trails due to logging operations, or flooded sections of trail by beaver in the fall. These reroutes are temporary in nature lasting a few weeks to 1-2 seasons depending upon scope of the project.

Additionally, there have been and will continue to be minor reroutes that are necessary to correct changes in recreation easements for GIA trails over private lands. These corrections are typically made using unplowed forest roads that result in no net gain in snow grooming activities. If a reroute requires earth disturbing activities a decision notice or memo is prepared to disclose environmental effects.

In 2017, the Forest Recreation Program made corrections to Infrastructure Database (INFRA) and Geographic Information System (GIS) data that incorrectly designated summer hiking trails as over the snow trails. This database correction reduced the total designated over the snow trails from 378 mile to 313 miles. Table 71 displays the updated list of designated over the snow trails.

### Implications

There hasn't been an increase in the snowmobile routes across the Forest thus no reduction in large tracts of undisturbed areas desirable for lynx. The actual number of snowmobile routes decreased across the Forest due to database corrections that incorrectly designated summer only hiking trails as over the snow trails.

This monitoring question looks to the effect of designated over-the-snow-trail routes and roads used by snowmobiles but do not consider a designated trail that may also affect the lynx habitat. This use of roads and other habitat effects such as continuous habitat and population/distribution of prey species may also have effects on lynx.

### New Issues

Each year, snowmobile clubs from Itasca County approach the Forest Service with proposals to add approximately 20 miles of groomed Grant-in-Aid snowmobile trails that follow existing roads. The intention is to create additional trail riding opportunities and to connect local

businesses to the extensive snowmobile trail system. The Forest has not had the budget to respond to these proposals.

Further evaluation of the Forest Plan in the context of responding to the creation of snowmobile trails has identified the discrepancy between S-SWL-2 and O-RMV2.

#### Recommendations

- Monitor snowmobile and other winter recreation activity use on non-designated winter trails that may impact forging sites within large undisturbed areas.
- Reconcile the discrepancy between the O-RMV-2 and S-SWL-2 in terms of the original intent of the Forest Plan.

### **Wildlife: Threatened and Endangered Species, Sensitive Species & Ecological Conditions – Management Indicator Habitats (MIH)**

This resource area monitors and evaluates habitat trends of designated Management Indicator Habitats (MIH). Given the wide array of wildlife species that occur on the Forests, MIHs were identified to provide a simplified, practical and reasonable approach to monitoring a broad spectrum of species at the landscape level. A key assumption in applying and evaluating MIHs is that ecological conditions are likely to provide for species viability and maintain well-distributed habitats if there is an adequate representation of the range of habitats that would have been present under the range of natural variability (FEIS p. 3.3.1-2, USDA Forest Service 2004)).

This section focuses on the summary for terrestrial forested MIHs 1-9 and 11-13 and their progress towards meeting Forest Plan objectives for habitats.

#### **Monitoring Question**

To what extent is Forest management contributing to the conservation of Threatened, Endangered, and Sensitive Species and moving toward short term (10-15 years) and long-term (100 years) objectives for their habitat?

#### *Last Updated*

Data was calculated in April 2018.

#### *Monitoring Indicator(s)*

- Management Indicator Habitats 1-9 by age class and Landscape Ecosystem
- Management Indicator Habitats 11-13
- Qualitative description of mitigation measures
- Individual Habitat Improvement Projects

#### *Monitoring Frequency*

List the frequency of data collection for each monitoring indicator.

#### *Background and Drivers*

Monitoring is based on 36 CFR 219.12 (a)(5)(iv) The status of a select set of ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed Threatened and Endangered species, conserve proposed and candidate species, and maintain a

viable population of each species of conservation concern (2012 PR). Monitoring meets the following Forest Plan Desired Conditions and Objectives: D-WL-1-9, O-WL-1-3, O-WL-17-32, D-WL-1-8, and O-WL-4-16.

### *Management Indicator Habitats 1-9 by age class and Landscape Ecosystem*

Management indicator habitats are based on groupings of forest types in different age classes (Table 72). The age groupings (Table 73) are surrogates for ecological, successional or vegetation growth stages that reflect a variety of habitat conditions and situations.

**Table 72 Management Indicator Habitats – Description and Forest Types**

MIH	Description and Forest Types
Upland forest	All upland forest types: jack pine, red pine, white pine, balsam fir-aspen-birch, spruce-fir, black spruce-jack pine, northern hardwoods, oak, maple, aspen, aspen-birch
Upland deciduous forest	All upland deciduous and deciduous dominated mixed forest types
Northern hardwood and oak forest	All northern hardwoods and oak forest types
Aspen-birch & mixed aspen-conifer forest	All aspen, birch, and aspen dominated aspen-birch-conifer mixed forest types
Upland conifer forest	All upland conifer and conifer dominated mixed forest types
Upland spruce-fir forest	All spruce-fir and spruce-fir dominated mixed forest types
Red and white pine forest	Both red and white pine forest types
Jack pine forest	Jack pine forest type
Lowland black spruce-tamarack forest	All lowland conifer and lowland mixed conifer types dominated by black spruce or tamarack

**Table 73 MIH 1-9 age grouping and forest types**

Forest Type	Young	Mature/Old	Old/Old Growth	Old Growth Multi-aged
Jack pine	0-9	40-59	60-79	80+
Red pine	0-9	50-119	120-149	150+
White pine	0-9	50-119	120-149	150+
Lowland black spruce-tamarack	0-9	60-119	120-149	150+
White cedar	0-9	60-119	120-149	150+
Spruce-fir	0-9	50-89	90-149	150+
Upland northern hardwoods	0-9	60-119	120-149	150+
Oak	0-9	60-99	100-149	150+
Lowland northern hardwoods	0-9	60-119	120-149	150+
Aspen-birch	0-9	50-79	80+	80+

All MIHs are compatible with and complementary to Landscape Ecosystem objectives.

By moving toward Decade 2 objectives for these resources the Chippewa National Forest will move toward long-term desired conditions for desired amounts, quality, and distribution of MIHs and their associated species.

## Results

The Forest Plan has tables for each LE that identifies MIH objectives along with age class and species composition objectives. Comparisons were made at the LE level to determine if the MIH trends were on track to meet the stated objectives for Decade 2 of Forest Plan implementation (USDA Forest Service 2004, Forest Plan, pages 2-53 thru 2-80). What follows is a summary of the highlights of LE MIH conditions.

### *Dry Pine LE*

**Table 74 Dry Pine LE MIH age classes 2017**

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Upland Forest	1,111	992	4,388	3,297	997	580	< 2,200	> 2,700	> 1,700
Upland Deciduous	449	344	1,627	957	474	170	< 500	< 1,300	> 100
Northern Hardwood	40	3	704	276	71	0	0	100	0
Aspen-Birch	408	341	923	680	403	170	< 500	< 900	> 100
Upland Conifer	662	648	2,761	2,341	524	410	< 1,700	> 1,400	< 1,600
Upland Spruce-Fir	0	0	29	10	40	5	0	0	0
Red and White Pine	310	296	2,709	2,309	63	43	< 300	> 1,200	100
Jack Pine	352	352	22	22	421	362	< 1,400	< 200	< 1,500
Lowland Black Spruce-Tamarack	0	0	91	81	5	5	0	< 200	> 100

- Jack pine acres continue to be well below Decade 2 objectives and has declined since 2015 instead of increasing (USDA Forest Service 2015).
- Aspen acres continue to be well above Decade 2 objectives.
- Old upland forest MIH continues to be below Decade 2 objectives. Forest aging will help to move towards this objective.

***Dry Mesic Pine LE*****Table 75 Dry Mesic Pine LE MIH age classes 2017**

Dry Mesic Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Upland Forest	3,402	2,139	32,872	11,852	13,480	3,180	< 9,500	< 35,200	> 7,800
Upland Deciduous	3,007	1,907	24,323	8,649	12,165	2,852	< 8,200	< 28,300	> 6,800
Northern Hardwood	816	614	19,020	6,811	961	314	< 600	< 10,500	> 800
Aspen-Birch	2,191	1,292	5,304	1,838	11,204	2,538	< 7,200	< 13,700	< 5,600
Upland Conifer	394	232	8,549	3,203	1,314	328	1,200	> 6,900	> 1,000
Upland Spruce-Fir	69	47	746	226	361	48	< 500	> 1,200	> 200
Red and White Pine	238	163	7,770	2,977	669	214	> 400	> 5,600	> 100
Jack Pine	86	23	33	0	285	67	> 300	< 200	< 700
Lowland Black Spruce-Tamarack	3	3	1,876	446	747	100	> 100	< 3,000	> 800

- Northern hardwoods and aspen acres continue to exceed Decade 2 objectives.
- White pine and upland spruce-fir acres continue to be below Decade 2 objectives and are declining in acreage instead of increasing. White pine declined by a few acres since 2015 while spruce-fir declined by about 240 acres since 2015 (USDA Forest Service 2015). Young red/white pine and young jack pine MIH's continue to be below Decade 2 objectives.

**Dry Mesic Pine – Oak LE****Table 76 Dry Mesic Pine –Oak LE MIH 2017**

DMPO MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Upland Forest	7,599	5,702	61,160	44,368	27,580	16,654	< 17,500	< 63,000	> 19,600
Upland Deciduous	4,876	3,533	29,586	18,181	17,646	9,068	< 11,200	< 32,800	< 11,500
Northern Hardwood	837	608	16,293	10,331	2,170	1,689	< 300	> 10,800	> 1,100
Aspen-Birch	4,039	2,925	13,292	7,850	15,476	7,379	< 10,800	< 19,700	< 9,900
Upland Conifer	2,723	2,170	31,574	26,187	9,934	7,585	> 6,300	> 30,200	> 8,100
Upland Spruce-Fir	123	77	1,044	552	963	420	< 700	< 2,300	> 300
Red and White Pine	1,729	1,561	30,330	25,495	7,215	6,243	2,600	> 27,300	> 3,500
Jack Pine	871	532	200	140	1,755	922	> 3,000	< 600	< 4,300
Lowland Black Spruce-Tamarack	99	67	5,758	3,483	3,122	2,080	> 300	< 9,500	> 1,800

- Aspen acres continue to exceed Decade 2 objectives.
- Jack pine and red pine acres continue to be below Decade 2 objectives. Jack pine has declined instead of increased since 2015. Jack pine acres declined by about 755 acres since 2015. Red pine has increased since 2015 (USDA Forest Service 2015). Young jack pine and red/white pine MIH's continue to be below Decade 2 objectives, especially jack pine.
- Young lowland black spruce-tamarack MIH is below Decade 2 objective.

**Boreal Hardwood – Conifer LE****Table 77 Boreal Hardwood – Conifer LE MIH 2017**

BHC MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Upland Forest	5,972	1,816	29,624	9,858	15,650	3,518	< 12,000	< 33,000	> 7,600
Upland Deciduous	5,472	1,763	25,168	9,303	14,639	3,204	< 10,600	< 26,800	> 6,700
Northern Hardwood	342	84	14,827	6,936	2,587	1,035	< 200	< 10,200	> 900
Aspen-Birch	5,130	1,679	10,341	2,367	12,051	2,169	< 10,400	< 16,600	> 5,700
Upland Conifer	500	53	4,455	556	1,012	314	< 1,400	> 6,200	> 900
Upland Spruce-Fir	329	49	1,865	177	733	159	< 100	4,600	> 500
Red and White Pine	112	4	2,585	375	228	150	100	> 1,600	> 200
Jack Pine	60	0	6	4	51	5	< 300	0	< 200
Lowland Black Spruce-Tamarack	266	43	8,156	1,133	4,900	499	> 900	< 12,200	> 3,100

- Aspen and northern hardwood acres continue to exceed Decade 2 objectives.
- White pine and spruce-fir acres continue to be below Decade 2 objectives. White pine has slightly increased since 2015. Spruce-fir continues to decrease instead of

increasing on the forest. Spruce-fir has declined by over 1,300 acres since 2015 (USDA Forest Service 2015).

- Mature and older upland conifer MIH's continue to be below Decade 2 objectives.
- Young lowland black spruce-tamarack MIH continues to be below Decade 2 objective.

### ***Mesic Northern Hardwoods LE***

**Table 78 Mesic Northern Hardwoods LE MIH 2017**

- Aspen and northern hardwoods acres continue to exceed Decade 2 objectives.
- Spruce-fir acres continue to be below Decade 2 objectives. Spruce-fir has declined by about 460 acres since 2015, instead of increasing (USDA Forest Service 2015).

MNH MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Upland Forest	1,978	520	29,333	11,906	10,103	3,258	< 7,200	< 30,500	> 4,800
Upland Deciduous	1,777	443	27,625	11,608	9,831	3,144	< 6,800	< 29,100	> 4,300
Northern Hardwood	348	225	22,722	10,354	2,983	1,740	< 300	> 17,300	> 1,700
Aspen-Birch	1,429	383	4,903	1,253	6,848	1,404	> 6,500	< 11,100	> 2,600
Upland Conifer	202	77	1,707	298	272	115	> 300	> 1,400	> 500
Upland Spruce-Fir	78	0	475	8	181	85	> 200	> 1,000	> 300
Red and White Pine	123	77	1,232	290	76	26	< 200	> 400	> 200
Jack Pine	0	0	0	0	15	4	0	0	0
Lowland Black Spruce-Tamarack	47	34	1816	326	747	82	0	< 2,600	> 700

- Young aspen MIH is well below Decade 2 objectives.
- Young, mature, and old spruce-fir MIH's are well below Decade 2 objectives.

### ***Tamarack Swamp LE***

**Table 79 Tamarack Swamp LE MIH 2017**

TS MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Upland Forest	502	348	6,005	3,157	4,910	2,983	< 1,700	< 6,200	> 2,000
Upland Deciduous	445	291	4,493	2,285	4,075	2,541	< 1,500	< 4,700	1,400
Northern Hardwood	68	64	2,117	1,377	1,095	992	< 100	1,300	> 100
Aspen-Birch	377	227	2,376	908	2,980	1,549	< 1,400	< 3,300	< 1,300
Upland Conifer	57	57	1,512	872	835	442	> 200	1,500	> 500
Upland Spruce-Fir	9	9	593	151	547	156	< 100	< 1,200	> 0
Red and White Pine	49	449	919	721	231	230	200	> 300	> 300

TS MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Jack Pine	0	0	0	0	57	56	> 100	0	< 100
Lowland Black Spruce- Tamarack	222	138	11,108	5,358	6,431	2,352	> 700	< 15,700	> 4,100

- Aspen and northern hardwood acres continue to be above Decade 2 objectives.
- Red pine acres continue to be below Decade 2 objectives.
- Spruce-fir acres continue to be well below Decade 2 objectives. Spruce-fir has declined by over 100 acres since 2015, instead of increasing (USDA Forest Service 2015).
- Mature northern hardwoods MIH currently exceeds Decade 2 objectives.
- Old aspen-birch MIH currently exceeds Decade 2 objective.
- Young and old red/white pine MIH's continue to be below Decade 2 objectives.
- Young lowland black spruce-tamarack MIH continues to be below Decade 2 objective.

### *White Cedar Swamp LE*

**Table 80 White Cedar Swamp LE MIH 2017**

WCS MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives		
							Young NFS	Mature NFS	Old NFS
Upland Forest	460	0	1,472	17	1,740	23	< 1,800	< 2,500	> 400
Upland Deciduous	460	0	1,369	17	1,690	23	< 1,800	< 2,300	> 300
Northern Hardwood	0	0	221	17	356	0	0	< 200	0
Aspen-Birch	460	0	1,148	0	1,334	23	< 1,800	< 2,100	> 300
Upland Conifer	0	0	103	0	50	0	0	< 300	> 0
Upland Spruce-Fir	0	0	94	0	28	0	0	< 300	> 0
Red and White Pine	0	0	10	0	0	0	0	0	0
Jack Pine	0	0	0	0	22	0	0	0	0
Lowland Black Spruce-Tamarack	0	0	648	3	303	0	0	< 900	> 200

- Aspen acres continue to exceed Decade 2 objectives.
- Spruce-fir acres continue to be below Decade 2 objectives. Spruce-fir has declined instead of increasing since 2015 (USDA Forest Service 2015).

### Discussion

Overall, conifers continue to be below MIH age and/or acres parameters for Decade 2 in most LE's. In some LE's conifers are declining instead of increasing, especially spruce-fir and jack pine.

MIH 7, mature/older red and white pine, remains above the Forest Plan Standard (S-WL-7) for maintaining 40,000 acres. MIH 7 is currently at 54,092 acres.



Aspen and in some LE's northern hardwoods continue to be over represented.

Young black spruce-tamarack MIH continues to be below Decade 2 objectives in the tamarack swamp, boreal hardwoods, and dry mesic pine/oak LE's. Future harvest in these forest types need to be completed with caution, due to the continued long-term decline in Connecticut warbler populations on the Forest (Walton et. al. 2017).

### Recommendations

- Where appropriate, conversion of aspen and hardwoods to conifers should continue to be implemented to meet long-term MIH objectives. Restoration of conifers is a slow process. Increasing conifer presence on the landscape, including both increasing conifers as within-stand diversity, and through conversion of forest types, is a primary benefit to numerous wildlife species. It remains one of the more important coarse-filter MIH objectives with respect to maintaining viable populations of wildlife species.
- Continue to monitor MIH 1-9 objectives. From a wildlife habitat perspective, it is important to pay particular attention to the older and conifer MIH's. They are the most lacking on the landscape.
- Given the continued decline of spruce-fir across all LE's, a closer look may need to be taken at this MIH. Future management actions that result in a reduction in spruce-fir should be further evaluated and reconsidered to help to reverse this trend. Forest type conversions to spruce-fir may need to be a higher priority to reverse this trend.

### Management Indicator Habitat – MIH's 11 - 13

MIH's 11 (Upland Edge Habitat), 12 (Upland Interior Forest), and 13 (Large Upland Mature Patches) were used during Forest Plan Revision to assess the size, shape, and arrangement of forest types, habitats, and vegetation communities resulting from disturbance. A part of the landscape coarse filter, some wildlife species require or benefit from specific spatial arrangements, including large patches of contiguous habitat, linkages of habitat patches, or juxtaposition of patches (USDA Forest Service 2004, FEIS p. 3.2-50).

Within the context of the largely forested landscape matrix of the Chippewa National Forest, habitat fragmentation relates primarily to changes in the forest stand size, species composition and age of stands. Limits on harvest size for even-aged management in the 1986 Forest Plan tended to reduce stand sizes and increase fragmentation effects. At the time of Forest Plan Revision, clear-cut harvests accounted for more than 90 percent of forest acres managed on the Chippewa. This type of management tends to increase edge and favor occurrence of popular wildlife game species such as deer and ruffed grouse. Conversely, it tends to act against species requiring larger areas of continuous forest. A number of wildlife and plant species have been shown to be associated with conditions existing in the interior of relatively large patches of mature vegetation, or to be adversely affected by the proximity of early seral stage vegetation and associated edge. (USDA Forest Service 2004, FEIS p. 3.2.52)

### ***MIH 11***

MIH 11 provides a measure of habitat fragmentation resulting from forest management intensity. It measures edge density (mile/mile<sup>2</sup>) of young forest (age 0-9) for uplands and lowlands. The perimeter of young forest stands created by management (i.e. even-aged regeneration timber harvest) was measured, and a density amount calculated for uplands and

lowlands forest. MIH 11 allows evaluation of species of management concern that are benefitted or adversely impacted by edge habitat, such as white-tailed deer, olive-sided flycatcher, American woodcock, and brown-headed cowbird (USDA Forest Service 2004, FEIS Table WLD-11 p. 3.3.2-1).

## Results

### *MIH 11*

Table 81 compares the edge density between the Forest Plan, currently, and future projections of edge density.

**Table 81 Management induced edge density (miles/miles<sup>2</sup>) for the Chippewa National Forest**

Year	Uplands (mi/mi <sup>2</sup> )	Lowlands (mi/mi <sup>2</sup> )
2004	2.76	0.33
2017	1.41	0.27
2022	1.41	0.31
Decade 2 Objective	1.70	0.37

The 2017 data include all planned but not yet implemented timber harvests from vegetation management projects to date. The 2017 data have been aged out for 5 years, by which time it is anticipated that most of these projects will have been implemented.

Management-induced upland edge density is a reflection of harvest intensity, i.e. even-aged regeneration harvest. The 2004 Forest Plan brought in a much more mixed set of harvest types than were used previously. Less even-aged regeneration harvesting (e.g. clearcut, shelterwood, seedtree) results in a lower edge density. Larger harvest unit sizes would also decrease edge density. The predicted edge density calculations for 2017 are currently below those that were forecast in the FEIS for the end of decade 2 (USDA Forest Service 2004, FEIS Table FSP-5 p. 3.2-72).

The following Forest Plan Objective is currently being met:

- O-WL-36 Reduce amount of forest edge created through vegetation management activities, while still retaining a range of small patches and edge habitat.

### *MIH 12*

MIH 12 provides a measure of the amount of forest interior habitat, which is used as an indication of habitat quality and the extent of large forest patches in a landscape. This indicator allows evaluation of species of management concern that are known or thought to benefit from environmental conditions associated with interior forest conditions. Table 82 displays the amount of interior forest on the Chippewa.

**Table 82 Acres of interior forest**

Year	Acres
2004	38,690
2017	43,071

2022	49,134
------	--------

Since 2004, there has been a steady increase in acres of forest interior. Interior forest is predicted to continue to rise through 2022, based on all planned but not yet implemented timber harvests and forest aging.

The following Forest Plan Objective has been met:

- O-VG-21 Increase amount of interior forest habitat.

Indicator Habitat 13 – Upland Mature Patches.

MIH 13 is the size and amount of large (>300 acres) mature and older (age 50 or older) upland forest patches.

Indicators 12 and 13 allow evaluation of species of management concern that are known or thought to benefit from environmental conditions such as interior forest, connected habitats, and patterns that emulate natural disturbances (USDA Forest Service 2004, FEIS p. 3.3.2-1), such as northern goshawk, goblin fern, spruce grouse, black-backed woodpecker, Connecticut warbler, red-shouldered hawk, four-toed salamander, Canada lynx, goblin fern, triangle grapefern, Goldie's woodfern, and Canada yew (USDA Forest Service 2004, FEIS Table WLD-12/13). These species are all currently listed as Regional Forester's Sensitive Species, or are federally listed as Threatened.

The 2004 Forest Plan numbers are not directly comparable to those provided in the FEIS. Since the FEIS was written, changes in forest stand delineation have caused the need to develop a new GIS script to calculate patches so as to allow direct comparisons of similar forest conditions between years, and a new "baseline" was generated to represent 2004 conditions. This technique was used to calculate acres and numbers of large, mature upland forest patches, as well as acres of forest interior.

## Results

Table 83 indicates that there has been a steady increase in the number and acres of large upland mature patches > 300 acres since implementation of the 2004 Forest Plan began. The number and acreage is predicted to continue to increase in the next 5 years.

**Table 83 Large upland mature patches on the Chippewa National Forest**

Size Class (acres)	2004 Forest Plan		2017		2022	
	Number	Acres	Number	Acres	Number	Acres
301-500	46	17,325	61	23,584	57	21,994
501-1000	31	20,897	44	29,372	42	29,254
1001-2500	14	20,844	15	23,492	22	32,008
2501-5000	2	6,072	2	5,577	4	11,929
5001-10000	5	31,521	5	31,975	5	35,713
<b>Total &gt; 300 ac</b>	<b>98</b>	<b>96,659</b>	<b>127</b>	<b>114,000</b>	<b>130</b>	<b>130,898</b>
<b>Total &gt; 1000 ac</b>	<b>21</b>	<b>58,437</b>	<b>22</b>	<b>61,044</b>	<b>31</b>	<b>79,650</b>

The following Forest Plan Objectives, Guidelines, and Standards have been met:

- O-VG-19 Maintain or increase the acres and number of patches of mature or older upland forest in patches 300 acres or greater.
- G-VG-1 Maintain a minimum of 19 patches of mature or older upland forest in patches of 1,000 acres or greater.
- S-VG-1 Maintain a minimum of 85,000 acres of mature or older forest in patches 300 acres or greater.

### Discussion

The combined results for MIH's 11, 12 and 13 indicate that conditions for wildlife species that require large upland mature forest patches and/or interior forest, or those that are sensitive to edge, are continuing to improve.

### Recommendations

Since the quantity of upland mature patches is being met, future management should concentrate on those that provide the highest quality habitat features. A qualitative analysis of upland mature patches was developed in 2017 (USDA Forest Service 2018). Continue to follow through on the results of the analysis.

Look for opportunities to improve habitat in upland mature patches. For example, some upland mature patches contain red pine stands of plantation origin which currently may be providing poor quality wildlife habitat.

### Qualitative Description of Mitigation Measures

Mitigation measures are an integral part of implementing the Forest Plan. The Forest Plan provides Standards and Guidelines that identify site specific and landscape scale mitigation measures for project implementation to alleviate or reduce potential impacts to certain wildlife species or their habitat.

### Results

#### ***Bald Eagle***

S-WL-3 Management activities for bald eagles is governed by the Northern States Bald Eagle Recovery Plan (Northern States Bald Eagle Recovery Team 1983). Activities around known nests are managed in 3 zones:

- Primary Zone – All land use except actions necessary to protect or improve nest sites should be prohibited within 330 feet of the nest.
- Secondary Zone – Land use activities that result in significant changes to the landscape, such as clearcutting, land clearing, or major construction, should be prohibited. Actions such as thinning or maintenance of existing improvements can be permitted within 660 feet of the nest.
- Tertiary Zone – Some activities are permissible in this zone except during the most critical period from February 15 to August 31 within ¼ mile of the nest.

#### ***Canada Lynx***

Lynx habitat management is governed by Forest Plan Standards and Guidelines to conserve and maintain habitat for lynx and their primary prey, snowshoe hare. For vegetation management

projects occurring within Lynx Analysis Units (LAU) the following Standards and Guidelines applied:

- G-WL-1 within LAUs on NFS land, moderate the timing, intensity, and extent of management activities, if necessary, to maintain required habitat components in lynx habitat, to reduce human influences on mortality risk and inter-specific competition, and to be responsive to current social and ecological constraints relevant to lynx habitat.
- G-WL-2 Provide for the protection of known active den sites during the denning season.
- G-WL-3 Limit disturbance with each LAU on NFS as follow: if more than 30% of the total lynx habitat (all ownerships) within an LAU is currently in unsuitable condition, no further reduction of suitable conditions should occur as a result of vegetation management activities by the National Forest.
- S-WL-1 Management activities of NFS land shall not change more than 15% of lynx habitat on NFS land within an LAU to an unsuitable condition within a 10-year period.
- G-WL-4 Within an LAU, maintain or promote well distributed denning habitat in patches generally larger than five acres, compromising at least 10% of lynx habitat.
- G-WL-5 Following a disturbance on NFS land greater than 20 contiguous acres (such as a blowdown, fire, insect, or disease) that could contribute to lynx denning habitat, generally retain a minimum of 10% of the affected area on NFS land unless salvage or management-ignited fire is necessary to address human health and safety.

### ***Northern Goshawk***

Northern goshawk territories are governed by Forest Plan Standards and Guidelines for nesting and post-fledging zones within known territories. They include:

- S-WL-8 At northern goshawk nest sites with an existing nest structure, prohibit or minimize, to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (March 2 – August 31). Maintain 50 acres around the nest in 100% mature forest conditions.
- G-WL-24 Within northern goshawk post-fledging areas, minimize activities to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (March 2 – August 31). Within a 500 acre area encompassing all known nests, maintain suitable habitat conditions on a minimum of 60% of the upland forested acres.

In addition to S-WL-8 and G-WL-24, the forest also manages goshawk habitat in the foraging zone. Within a 16,000 acre area encompassing all known nests, maintain suitable habitat conditions on a minimum of 40 percent of the upland forested acres. Evaluating the foraging zone allows for an overall assessment of habitat conditions in a goshawk territory.

### ***Red-shouldered hawk***

Red-shouldered hawk territories are governed by Forest Plan Guidelines for nest and post-fledging zones with known territories. They include:

- G-WL-13 At red-shouldered hawk nest sites with an existing nest structure, prohibit or minimize, to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (April 1 – August 15). Maintain 50 acres around the nest in 100% mature forest conditions.
- G-WL-14 Within red-shoulder hawk breeding territories, minimize activities to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (March 2 – August 31). Within a 600 acre area encompassing all known nests, maintain suitable habitat conditions on a minimum of 90% of the upland forested acres.

### ***Black-backed woodpecker***

Black-backed woodpecker habitat and nest sites are governed by Forest Plan Guidelines. They include:

- G-WL-19 Protect known nest sites with a 200 foot radius surrounding nest sites until young have fledged.
- G-WL-20 Where ecologically appropriated, retain 6-10 jack pine per acre in even aged regeneration harvests in mixed conifer stands.

### ***Upland Mature Patches***

Upland mature patches are governed by Forest Plan Standards and Guidelines for maintaining mature/older forest conditions. They include:

- G-VG-1 Maintain a minimum of 19 patches of mature or older upland forest in patches of 1,000 acres or greater.
- S-VG-2 Maintain a minimum of 85,000 acres of mature or older forest in patches 300 acres or greater.
- S-VG-3 In mature or older upland forest types managed to maintain patches of 300 acres or greater, vegetation management treatments that maintain a 50% minimum canopy closure and maintain large diameter trees are allowable.

### **Discussion**

The Forest Plan provides for the protection, enhancement, and maintenance of wildlife habitat at a site-specific scale and at a landscape scale. Continuing to use this two-tiered approach will be important to maintain and improve wildlife habitat and reduce potential impacts from proposed projects on the Forest.

### **Recommendations**

Continue to manage bald eagle nest sites according to the Northern States Bald Eagle Recovery Plan (Northern States Bald Eagle Recovery Team 1983).

Canada lynx Forest Plan Standards and Guidelines should be updated to reflect current management guidelines in the 3rd edition of the Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013). The Chippewa NF is now located within secondary/peripheral areas which have more liberal management direction.

The effectiveness of the nest buffers surrounding northern goshawk nests should be evaluated to determine if they are providing sufficient habitat for maintaining territories.

Since the number and acres of upland mature patches is currently above Forest Plan Standards and Guidelines, the quality of the patches should be further evaluated. Future management should look at maintaining those patches of the highest quality and potentially improving or reducing the patches of lower quality.

### *Habitat Improvement Projects*

Planning and implementing wildlife habitat improvement projects across the Forest allows the Forest to be pro-active in improving wildlife habitat. Forest Plan Desired Conditions (USDA Forest Service 2044) D-WL- 1, 2, and 3 identify the need to provide habitat and maintain viable populations for all existing native species and contribute to the conversation and recovery of federally-listed, proposed, or candidate threatened and endangered species and their habitat.

### Results

In 2017, the Lydick Brook East Wildlife Habitat Improvement Project Decision Memo was signed. This project is located on the Blackduck Ranger District. The objectives of this project are to increase stand structure; increase species diversity; promote snag development; promote coarse woody debris; promote native plant communities; and to improve the resiliency of the red pine forest through diversification. The project is located within a large upland mature patch that is dominated by plantation origin red pine.

Implementation of this project is being completed cooperatively with The Nature Conservancy through a stewardship agreement.

### Discussion

The Forest continues to have opportunities to be pro-active in planning and implementing wildlife habitat improvement projects for a myriad of wildlife species and habitat types. Recently emerging concerns, such as the decline in pollinators, increases the opportunities and need to be pro-active on the Forest.

### Recommendations

Continue to look for opportunities to improve habitat conditions within upland mature patches.

Use more non-traditional approaches to thinning red pine plantations, such as variable density thinning, to accelerate habitat improvement.

Look for opportunities to improve habitat for pollinator species.

### Evaluation of Monitoring Question and Indicator(s)

Our monitoring programs are subject to change as needed (adaptive monitoring). This section is to offer recommendations on how we can improve this monitoring question and indicator(s), if any. If recommending the elimination of this question or indicator(s), offer justification as to why. Changes to the monitoring program can be made with an administrative change to the LMP.

### References

Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Northern States Bald Eagle Recovery Team. 1983. Northern states bald eagle recovery plan.

USDA Forest Service. 2004. Final environmental impact statement. Chippewa and Superior National Forests: Forest Plan Revision. Vol. 1.

\_\_\_\_. 2004. Final environmental impact statement. Chippewa and Superior National Forests: Forest Plan Revision. Vol. 2 Appendices. Appendix D management indicator habitats.

\_\_\_\_. 2004. Chippewa National Forest: Land and resource management plan.

\_\_\_\_. 2015. Monitoring and evaluation report FY 2015. Chippewa National Forest. August 2015.

\_\_\_\_. 2018. Chippewa National Forest – Upland mature patch quality assessment project final report. Chippewa National Forest. April 2018.

Walton, G.W., J.D. Bednar, A.R. Grinde, and G.J. Niemi. 2017. Summary of breeding bird trends in the Chippewa and Superior National Forests of Minnesota – 1995 – 2017. Natural Resources Research Institute, University of Minnesota – Duluth. October 18, 2017.



## Chapter 3. ADMINISTRATIVE CORRECTIONS AND AMENDMENTS TO THE FOREST PLAN

The Chippewa National Forest Land and Resource Management Plan (Forest Plan) was revised in 2004 in accordance with the 1982 Planning Rule. Since 2000, a number of planning rules have been in effect. Administrative corrections were made in accordance with the Planning Rule (PR) in effect at the time of the change. The most recent change, the 2012 Planning Rule, went into effect on March 23, 2012.

All of the changes to the Forest Plan thus far have been minor in scope.

**Table 9 Listing of Forest Plan amendments, corrections, or errata.**

Type of Change	Date	Content
Amendment 1	11/15/2007	Change to Guideline on prohibited OHV use (G-ORV-1)
Amendment 2	06/04/2009	Change to North Winnie SPM Boundary
Amendment 3	07/19/2013	Project Specific amendment for mature and older jack pine forest (S-WL-10)
Administrative Correction 1	08/17/2006	Change to Glossary definitions
Administrative Correction 2	08/30/2006	Change to Monitoring Plan
Administrative Correction 3	08/18/2006	Change to Timber Management Guideline (G-TM-7)
Administrative Correction 4	08/18/2006	Change to Heritage, Recreation, and Access Guideline (G-WSR-7)
Administrative Correction 5	08/18/2006	Correction to Executive Summary Table
Administrative Correction 6	08/18/2006	Change to Watershed Health, Riparian Areas and Soil Resources Table (Table G-WS-8a)
Administrative Correction 7	08/18/2006	Change to SIO Map
Administrative Correction 8	09/18/2006	Change to National ORV Definitions
Administrative Correction 9	09/14/2007	Change to Proposed and Probable Practices
Administrative Correction 10	08/10/2009	Change to Boundary of Candidate Research Natural Area, Sunken Lake
Administrative Change 11	04/28/2016	Chapter 4 Monitoring and Evaluation Change
Errata 1	08/18/2006	Change to Record of Decision (ROD)

Changes to the monitoring program (Forest Plan, Chapter 4) were made in 2016 to bring it into alignment with direction provided in the 2012 Planning Rule (36 CFR Part 219.12).

The amendments, administrative corrections, as well as the corrected pages from the set of Plan documents can be found at:

<https://www.fs.usda.gov/main/chippewa/landmanagement/planning>

We encourage people to use this resource for accessing the most up to date information on amendments and administrative corrections. Future amendments will also be listed in the Chippewa National Forest Schedule of Proposed Actions which is distributed quarterly. We will continue to provide opportunity for public involvement at the project level and during any substantive changes to the Forest Plan.

## Chapter 4. PREPARERS

### Preparers

The following people collected, evaluated, or contributed time and or data for this Monitoring and Evaluation Report.

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